QUEENSLAND AGRICULTURAL JOURNAL

VOL. XII. DECEMBER, 1919. PART 6.

Agriculture.

AGRICULTURE: WHAT IT MEANS TO OUR CITIES.

On 28th October, Mr. Cuthbert Potts, Principal of the Queensland Agricultural College, Gatton, delivered a lecture in the Albert Hall, under the auspices of the Brisbane Chamber of Commerce, on the above text.

The importance of agriculture to the State, its country population, and its cities, warrants us in devoting space to the full text of Mr. Potts's lecture, which reads as follows:—

When a large area of new country is undergoing development, the process is much as follows:—Small isolated areas are selected and settled and become known. The intervening spaces, with all their possibilities, remain unrecognised. Then comes a time when someone, knowing all the separated areas, suddenly gets a breadth of view, and this man realises that all these isolated areas might be linked together, converting the lot into a district, for the betterment and advancement of each and every part. Perhaps this vision came merely because some high hill or mountain was climbed and the whole land suddenly came under observation. Perhaps the conception was due to some other chance event which caused man to stop and think, to look outward, and to collate his knowledge. But whatever the cause, this remains: If someone has visualised great possibilities, and his vision is true, others quickly realise the situation. The idea spreads, it gathers weight, and the necessity to take action becomes imperative. Then follows a period of exploration, survey, and mapping. Carefully conceived lines of communication are built, new areas are developed, and the result is a united district.

I think this process of development is applicable to all big problems of human affairs. In particular it is applicable to our outlook on Agriculture. So, if to-day I can show you a wide and extended view of

agriculture in its relations to our cities—a view of the whole situation as if you were looking out from the top of a high mountain—then I am sure you will not be satisfied until the work of "exploration, survey, and mapping" has been proceeded with, and the necessary lines of linkage have become accomplished facts.

The problem before us to-day is *Agriculture and what it means to our Cities,* and the chance event which has brought this matter urgently before us is the war, or, rather, the necessity for reconstruction and development following the war. We have arrived at a time when we must "stop and think, and look outward and collate our knowledge" in regard to this matter.

AGRICULTURE IS OUR BIGGEST INDUSTRY.

To prevent any misunderstanding, it is necessary to state that the term agriculture is used throughout this address in its widest sense, so as to embrace all production from the land, whether pastoral, grazing, or farming. With this definition let us examine what part agriculture plays in the production of Australia's annual national wealth. This is well illustrated by a consideration of the statistical figures showing the average annual production from industry for the five-year period immediately prior to the war.

Average Annual Production from Industry—1909-1913.

Agricultural Production—			Percentages.	
(Agriculture) farming ..	£42,300,000		21·7	
Pastoral	53,613,000		27·5	
Dairy, poultry, bees ..	18,436,000		9·5	
		£114,349,000	——	58·7
Forestry and fishing ..	5,550,000		2·8	
Mining	24,234,000		12·4	
Manufacturing ..	50,937,000		26·1	
		80,721,000	——	41·3

Thus, in the normal time immediately preceding the war, agricultural production was responsible for practically 60 per cent. of our Australian annual income. If we consider Queensland only, this percentage is probably much higher.

OUR CITIES ARE DEPENDENT ON AGRICULTURAL PRODUCTION.

In making this statement, there is no desire to deny that our cities are absolutely essential for the successful development of our agriculture. But granting this as an important fact, we have still to face the problem—what is the relative position of cities and agriculture? A small examination shows that the cities are dependent on it. Consider for one moment what would be the effect if the produce from the land were completely cut off from the city, even for a week. There would be no milk, no bread, no meat, no butter or jam, or clothing, &c. Think of the human suffering that would result; but think further of your trams, your picture shows, your many activities which constitute civilian life. They would all cease. But let us reverse the problem. Suppose the

cities were suddenly obliterated, what would be the effect on agriculture? Agriculture would receive a set-back, but it would not be annihilated. Agriculture could and would continue to exist without our cities, though the stage of civilisation would be low.

Absurd as this problem seems, it is of importance, because it enables us to get a better conception of the true relations between our cities and our agriculture. Thus, if our cities vanished—ceased to exist—agriculture with a low type of civilisation would remain. Starting from this basis—that is, no cities, and only agriculture—let us see what would result. If agriculture develops, cities become not only possible but they become necessary. Time prevents me from giving the mathematical argument beyond this. Suffice it to say that if we go back, the cities fail more rapidly than agriculture. If we go forward, the cities develop in a greater ratio than the development of agriculture. To put the matter crudely—If our present agricultural production were permanently reduced to one-half, our cities would degrade by more than 50 per cent.; but if our agricultural production were doubled, then our city development would be more than 100 per cent.

To a great extent, the argument given above applies to our manufactures, and it would apply absolutely if our manufacturing were developed up to the full extent of our primary production. Unlike Great Britain, Australia is not an importer of raw goods. Such raw goods as we handle are home-grown. Hence manufacturing in Australia is dependent on our agriculture.

WHAT AFFECTS AGRICULTURE IMMEDIATELY AFFECTS OUR CITIES.

From what has been said above, we can see how intimately the prosperity of our cities is bound up with the prosperity of our agriculture. This applies to Australia in particular, because, as shown, about 60 per cent. of our annual national wealth is derived directly from the land. If we have a number of good years during which agriculture prospers, then our cities prosper, but in greater ratio. Should a drought occur, or should there be a succession of adverse seasons reducing production by, say, 20 per cent., then the cities suffer, but by more than 20 per cent. How vastly important, then, for the cities to see that agriculture is prosperous, progressive, and stable.

This brings us back to the war. In view of what has been said before, we have to ask ourselves a very pertinent question. Has our agriculture advanced during the war period, or has it gone back? If it has advanced, we can face the future with confidence, but if it has gone back, then the outlook is serious, and requires our immediate and whole-hearted attention.

Let us examine the war period. The year 1915 was a drought-year. Again, in 1918, drought visited the country, and this drought is still with us. If there were no other circumstances to take into consideration, we could confidently assume that our agriculture had received a set-back, and that the consequent set-back to our cities would result. But there is one big disturbing factor—the war. Has this prevented the droughts from having their usual effect, or have the effects been intensified? Perhaps we can get some information by examining the statistical figures for 1917.

Production from Industry—1917.

			Percentages.
Agricultural Production—			
(Agriculture) farming ..	£57,967,000		20·4
Pastoral	93,414,000		32·7
Dairy, poultry, bees ..	31,626,000		11·3
		£183,007,000	—— 64·4
Forestry and fishing ..	5,600,000		1·9
Mining	25,591,000		9·1
Manufacturing ..	70,000,000		24·6
		101,191,000	—— 35·6

The figures for forestry, fishing, and manufacturing are not complete, and have been estimated.

Glancing at the percentages shown in this table, it would seem that agriculture has increased in importance with regard to the production of our annual national wealth. This may be so, but it is not what we are searching for. What we want to know is, whether agricultural production has actually increased or not. Comparing the two statistical tables, here given, the value of agricultural products for 1917 shows a presumable increase of nearly £70,000,000. But these figures, satisfactory as they appear, cannot be taken as they stand. The pound sterling of 1917 has not the same value as the pound sterling of 1909-13. The depreciation in the value of the sovereign is probably about 33 per cent., and if this is taken into consideration, agricultural production shows no substantial increase. But again:—The year 1917 was a comparatively good year, and the preceding year was also good. We had a drought in 1915, and drought conditions again appeared in 1918 and are still with us. If we had the complete figures for the five-year period 1914-19, it is very doubtful if we could show any increase of agricultural production. In fact, there is strong collateral evidence indicating that the actual production from the land has decreased and not increased during the war period. If this deduction is correct, the matter is serious, for eventually our cities must suffer. I know you can say they are not suffering now. In fact, they seem to be very prosperous. You can also claim that business is very brisk. But we have to remember that normal financial reactions have been blinded—camouflaged—by the necessary expenditure of large amounts of loan money during the war.

THE GREATER NUMBER OF OUR PEOPLE LIVE IN THE CITIES.

In Australia there are probably five or six town workers for each worker on the land. This is as it should be in a highly civilised country. There is no desire to lower this ratio, rather we may hope that the ratio may be increased. But if this ratio is increased and a still greater proportion of our people live in the cities, this will in no way detract from the importance of agriculture to the community. All it will mean is, that the man on the land has become more proficient, and in consequence it is possible to release a greater number to carry out important wealth-producing functions of a higher civilisation. As our cities become relatively more populous, the situation will become more delicate, for, as we have pointed out above, our cities are dependent on agriculture. So in the future, more so than at present, we must expect to find the majority of our people dependent on the success of a few, viz., our agricultural community.

How important, then, for the cities to take every precaution to ensure that agriculture is prosperous.

From the above it must not be assumed that Australia, and particularly Queensland, is in a state of development at the present time which would justify us in stimulating a migration from the country to our cities. Probably, at the immediate moment, a migration from cities to country is more essential. But, whatever the demands of the present, the fact remains that a higher civilisation requires a higher ratio of town workers, but it must not be forgotten that this state of affairs is only stable provided the agriculture of the country is both prosperous and highly efficient.

NUMBERS COUNT IN DETERMINING THE POLICY FOR A COUNTRY.

So far, an endeavour has been made to indicate how intimately the prosperity of our cities is dependent on the prosperity of our agriculture. Further, an attempt has been made to emphasise the urgency of the present situation because of the necessity for reconstruction, also because of the drought, but mainly, because it is almost certain that our production from the land has decreased during the war period. Strange as it may seem, this problem is mainly the concern of the cities. They control the situation. The cities have the numbers, and numbers count in determining the policy of a country. It lies, then, in the hands of our cities to make our agriculture stable and prosperous. I am afraid, however, that the general city attitude has been one of neglect of or indifference to agriculture. Agriculture has been looked on as a fair field for exploitation rather than as our biggest industry, requiring sympathetic and intelligent assistance for development. This attitude of neglect may be natural, but it is obviously wrong and foolishly selfish. For "if you neglect your country, the grass will soon grow in the streets of your cities, but if your country prospers, the cities will leap ahead into prosperity."

WHAT ARE THE CITIES DOING FOR AGRICULTURE?

We have seen that the cities have much to gain from agriculture, but there is a reverse side to the problem. The cities have certain obligations to agriculture. Are these being honoured?

Let us examine one or two points. First, consider the general education system of the State. Examine it carefully, from our University down to the primary schools, and you will find that even the mention of agriculture is conspicuous by its absence. Where we find, as in rural schools, an attempt to handle the subject, we find it immediately isolated from the general school course. In other words, agriculture, our biggest industry, finds no place in our general education. The result is, that the majority of our citizens grow up *incapable of thinking in terms of our most important industry.* This in itself is bad, but even worse is the attitude towards agriculture which is unconsciously fostered. The very isolation of the industry with regard to our schools has a tendency to degrade it. Most of our boys and girls grow up with a contempt for agriculture, and we find this feeling embodied in the schoolmaster's so often given advice "to put the boy on the land, he is no good at school work."

With such schooling behind them, is it any wonder our cities fail to fully understand what agriculture means to them?

But there is a second point worth considering. This is the finance of agriculture. Every industry requires a legitimate and systematic system of credit if it is to thrive and progress. Have we organised such a system for agriculture? Perhaps the best way to illustrate this is to briefly describe what is taking place at the present time. The absurdity of the situation must appeal to you all.

We are in the grip of a drought. Ever since this began, the farmers have been obtaining credit from their local storekeepers. To begin with, this was just the ordinary convenience, but as the dry weather continued, the storekeeper has been compelled to give still more and extended credit. He cannot close on the farmer. That would be fatal. For in the middle of a drought, farm properties have lost value, and would be difficult to realise on. The only security is in futurity. The farmer has to be carried on. As a result the storekeepers must obtain credit from their wholesale houses. These, in turn, go to our banks and financial institutions. Thus in drought times the country compels the cities to make a loan under the most disastrous and least secure conditions.

Now follow what takes place when the drought breaks. The banks, being far removed from the farmer, and probably somewhat ignorant of actual conditions, ask for a reduction of the overdraft allowed to the big mercantile houses. These, in turn, apply to the country storekeepers, who are compelled to bring pressure on to the individual farmer. In order to meet his liabilities, the farmer is forced to sell his produce. But, with the breaking of the drought, everyone has produce; markets have collapsed, and may even be glutted.

In all conscience, is this sound finance? Yet this repeats itself with every recurring drought.

Just think of the number of stages in this compulsory and unsecured loan. Each party must charge an interest which will cover the risk, and the accumulation of the risk is passed on for the farmer to meet, while the conditions are so organised, or disorganised, that he is forced to sell his produce on a low market.

The pastoralist and grazier may be in a somewhat better position inasmuch as they deal more directly with the banks. Still, the conditions are somewhat similar. That agriculture does not prosper as it should is not surprising. Rather, the surprising fact is that agriculture can still progress in spite of this heavy impost.

This, briefly, is the existing system of finance for the agricultural industry. How unconsciously ignorant it is is illustrated by our city papers, which are filled, during droughts, with advice as to conserving fodder.

WHAT THE CITIES MUST DO.

Having gone this far, it seems necessary to offer certain suggestions as to ways and means for meeting the situation.

First, I would insist that such action be taken that agriculture would receive due consideration throughout our education system. Don't think by this, that the teaching of technical agriculture in all the schools is advocated. It is not. In fact, the place to teach technical agriculture is not the school, it is at a specially equipped college holding a position in the system somewhat midway between the secondary schools and the University. The place to teach the science of agriculture is

at our University, but *the place to teach something of the economic value of agriculture, something of its history of human achievement, something of its romance, is in the schools.* Above all things, such action should be taken as will completely eradicate that covert sneer at agriculture which is unconsciously bred in our present school training. Perhaps the best means of accomplishing this would be to establish a School of Agriculture at our University. Obviously, if agriculture is unrecognised at our University, we must expect the schools to neglect the subject. Against the establishment of a School of Agriculture at the University, it will probably be argued that such a school would not at present attract any students. But are we justified in judging the value by the number of immediate graduates it would turn out? I don't think so. The value of such a school must be judged by the influence it would have on our national welfare, and a moment's consideration will show that a School of Agriculture at our University would have enormous possibilities for good. It would immediately influence our school training. (It has been shown above how important and desirable this is.) Next, it would be the natural centre for the investigation of our many important agricultural problems such as prickly-pear eradication, cattle tick control, &c. But, over and above this, it would bring and hold the importance of agriculture before the public. In each and every way, this school would make for the prosperity of Queensland. It would assist the advancement of land production and so render possible still greater progress in the cities. If this School of Agriculture were established now, it would be to the advantage of everyone, but it would be more valuable to our cities than to our country.

Recently, Sir Samuel McCaughey made a handsome bequest to our University. The necessity for rapid and stable reconstruction is urgent. Agriculture in Queensland, in Australia, must play a predominant part in this matter of reconstruction. Would it not seem wise to use a part of the McCaughey bequest to establish a School of Agriculture at our University?

The second suggestion I would make is, that our cities should immediately devise a proper system of credit for agriculture. I have indicated above the type of credit which our droughts compel. This can and should be improved upon. Unfortunately, in good seasons agriculture is forgotten; it is remembered when the drought comes, probably because the city shoe begins to pinch. Then we find our city papers full of advice as to fodder conservation, &c. But the time to conserve fodder is when the seasons are good, and *this fodder would be conserved if it could be financed.* Could a boot manufacturer afford to make hundreds of thousands of boots and hold them against a possible shortage of leather, unless he could obtain a loan on his manufactured articles? Neither can most farmers afford to conserve large quantities of fodder against a possible drought unless such conserved fodder is recognised as security for a possible loan.

Just imagine what it would have been to the wealth and prosperity of Australia if we had met the present drought with 10,000,000 tons of conserved fodder. Not only would the famine prices at present obtaining in our markets have been avoided, but much of the live stock which have died, and are now dying, would have been saved.

I am speaking of fodder conservation because at present it is the most obvious problem. Perhaps ultimately it will be found to be the most important; for our live stock can only be protected and stabilised by

this means. Recently, as you have probably all noted, fodder conservation has been receiving important consideration in New South Wales, where the Minister for Lands is suggesting some method of co-operative action. But whether the action taken is co-operative or individualistic, the basis of success lies in legitimate and systematic finance.

Suppose a farmer put 500 tons of lucerne hay, say, in stacks, with the object of holding it so as to place it on the market in times of drought. This would mean that this farmer was prepared to lock up in stacks, roughly, £1,000 of capital, for it costs, approximately, £2 per ton to put lucerne into the stack, and £3 per ton to put it on the market. How many farmers have £1,000 of idle capital? Aggregate this over the whole country, and could the farming community be expected to finance the conservation of, say, 10,000,000 tons of fodder? Yet this conservation would pay, but it is only possible if it is financed, and the control of finance lies in the cities.

I quite realise the many difficulties to be faced in organising a legitimate scheme of credit for agriculture. They are many and important. But these few facts remain. Fodder conservation, as typified by the present drought, is good security, probably the best. Can it be made a safe security? This is the problem before our financiers. It can. Probably the main difficulty would be a proper statistical knowledge of the amount of fodder conserved at any given time compared with the amount in sight and the probable requirements. A statistical bureau giving this information accurately and frequently, and up-to-date, would be essential. Beyond this the banks could operate on what would ultimately become the safest security in Queensland.

That these statistics are of importance is indicated by consideration of what is a nearly annual operation on the part of several of our commercial firms and some individuals. Throughout the growing season, these parties gather information as to the prospects of some of the crops, *e.g.*, lucerne, maize, &c. If the prospects are good and a year's abundance in sight, they don't operate, but if there is a probable shortage, they do. They buy in the flush of the season at minimum prices, hold in storage till the period of annual shortage, and more often than not quit their goods at a good profit. This is quite a usual practice. The chances of success depend on the accuracy of the information, statistical information, gathered. Surely, if this unorganised system of records can render it possible for individuals who have had no risk in the growing of the stuff to make a profit, a properly organised scheme of crop statistics must render fodder conservation a safe security for direct operation between the farmers and the banks.

So far, we have only spoken of fodder, but, as stated above, this is not the only agricultural problem requiring and warranting a proper system of credit. An equally important but less obvious matter is stock unfortunately too few, who have been endeavouring to improve their stock improvement. Amongst all our live stock raisers there are a few —unfortunately too few—who have been endeavouring to improve their stock. These breeders are making not only for their own personal advancement, but they are also making—and in great measure—for the advancement of all stockmen, *i.e.*, for the advancement of agriculture in general. But, given a drought such as the present one, do those stock improvers receive prior financial assistance? or, given good seasons, do they receive extra financial encouragement? To both these questions the answer is, "Very little, if any." Here again we have a state

of affairs which is only possible because of the general ignorance of the essentials of agricultural economics. Stock improvement may benefit the individual. It will certainly improve agriculture as an industry, and, in consequence, is an important item making for the prosperity of our cities.

This is not the wild imagination of a visionary. This problem of legitimate finance for agriculture has been found a necessity in other countries. At present the banks of the United States of America are actively organising and establishing a system. Surely it would be to the advantage of Australia to do likewise. This matter of finance for agriculture is fundamental to our prosperity and our power of reconstruction following the war. The difficulties to be faced are many. But if the matter is tackled and set in operation, and studied statistically, I venture to predict that a generation would see the financing of Australian agriculture on as sound an actuarial basis as our life insurance.

SOME HINTS ON STACK ENSILAGE.

This method of making silage is, of course, preferable to making no provision whatever for a supply of fodder in a dry time. But pit ensilage is still better, and a strong, air-tight, round reinforced silo is better than any. Where, however, a man's means do not permit of his going to the expense of making silos in or above ground, then the stack silo may be resorted to, and if the stack is properly made there will not be much loss, and even what there is will be eaten by stock when little else is procurable. The stack system is undoubtedly the cheapest and simplest of any.

A stack may be erected in the paddock where the crop is grown, so that a great saving in cartage is secured. It is also easier to make sweet silage in stack form than by the use of rigid silos, and a stack has unlimited capacity—that is, it may be made of any size suitable to the quantity of fodder grown. There is also less waste in the larger stacks, owing to the fact that the larger the stack the less the exposed surface in proportion to the mass.

There are two kinds of silage—the sweet and the sour. It is the former that is the most suitable to make under the stack system. It is in controlling the result, or, in other words, the production of sweet or sour ensilage at will, that the whole art of ensilage exists. The result depends upon the temperature which the mass has been allowed to reach and the amount of pressure applied.

If, after carting the green material, heavy pressure is at once applied, the air is excluded, and the temperature of the mass is consequently kept at a low level. When, by this means, the temperature is prevented from rising above 120 degrees Fahr., sour silage results. On the other hand, for the production of sweet silage, the mass must not be weighted to any great extent before the temperature has reached from 130 to 150 degrees Fahr.

Care must be taken not to let the temperature rise above 160 degrees Fahr., or the stack will become over-heated and burst. The intelligent use of the thermometer is the chief factor in successful ensilage-making, and to the neglect of these few simple details the many failures may be attributed.

An ordinary floating dairy thermometer is the most convenient type to use, an iron pipe of a slightly larger diameter being built into the middle of the stack in a vertical position. The thermometer may then, at any time, be lowered by a string, and the temperature taken at any required depth. The best advice as to building an ensilage stack was given as follows some time ago by Mr. Conlon, then dairy expert, Tasmania:—In building the stack—which, for the sake of avoiding cartage, may be built on a level spot in the open field—on the spot chosen a thick layer of straw should be laid down as a foundation, the size and shape being found by estimating that for every 3 tons of hay the crop may have produced about 10 tons of silage may be reckoned on. Having arrived at an approximate estimation of the weight, the base measurement should be somewhat as follows:—

For 15 tons, 9 ft. by 9 ft.; 20 tons, 10 ft. by 10 ft.; 50 tons, 13 ft. by 13 ft.; 100 tons, 16 ft. by 16 ft.

Only as much of the crop as can be carted and stacked in one day should be cut. A day or two should then elapse before adding more material. Then allow the temperature to rise, and also the mass to subside, which facilitates the work of stacking. In an ordinary large hay stack, the sides are built projecting outwards; this must be carefully avoided in building silage stacks. It is far better to have the sides and ends inclining inwards; there is then less tendency of the stack to lean over, which frequently happens, owing to the fermentation causing unequal settling of the mass. Should this occur, props must be set—at a wide angle—to the leaning side, when, on further subsidence taking place, the pressure brought to bear will bring the stack back to the perpendicular.

From the first load to the completion of the stack the greatest attention should be paid to the outside edges. This is a very important point. The outsides should be always kept higher than the centre when stacking, and should be made more compact by being well trodden down, the centre being left comparatively loose. When finished, the top should be levelled and covered with a layer of straw, pressure being then applied by piling the handiest material procurable on the top, so that a dead weight of about 1 cwt. per square foot is attained.

MAIZE ENSILAGE AT SOUTHBROOK.

Mr. A. E. Gibson has received from the manager of the Southbrook branch of the Queensland National Bank a rather interesting sample of stack ensilage from 2½ acres of broadcase maize, estimated at least at 30 tons. This quantity was found to be amply sufficient to keep twenty-five head of dairy cattle fed on it for fifteen weeks in full profit, with about two weeks' feed left.

The cutting and making of the stack employed two men for eight days between milking hours, the cutting being effective by the use of a binder.

The stack was located on a favourable spot on the farm, and when complete was weighted heavily with logs, stones, and a good coating of earth to keep any dampness out.

For feeding purposes, the material was simply cut out with a hay knife and thrown to the cattle, who took to it greedily.

WEALTH FROM RURAL INDUSTRIES IN SOUTH AUSTRALIA.

In the course of a statement before the annual congress of the South Australian Agricultural Bureau, the Director of Agriculture (Professor Perkins) made reference to pre-war agricultural and pastoral activities and revenue, and showed that the average annual income from those sources between 1911-12 and 1917-18 had been as follows:—Value of crops raised—farm crops, £7,869,000; vineyards, £543,000; orchards, £355,000; gardens and nurseries, £119,000; olive trees, £4,000; returned from sheep, £2,935,000; cattle, £1,601,000; poultry, £568,000; pigs, £325,000; horses, £53,000; bees, £16,000; making a mean yearly aggregate of £14,388,000. Taking the total area of land concerned in its production (125,248,000 acres), the mean yearly agricultural and pastoral revenue represented only 2s. 3½d. per acre. Of the aggregate area, however, 86,104,000 acres consisted of purely pastoral land, situated outside of county boundaries. That area had carried an average of 882,000 sheep, 102,000 cattle, and 23,000 horses, the gross returns from which he had estimated at £1,000,000 per annum. Thus there was left a gross revenue of £13,388,000 from 39,144,000 acres within county boundaries, or about 6s. 10s. per acre. Rrom the general standpoint that could scarcely be regarded as satisfactory, and implied that the country, as yet, was very inadequately occupied, also that there was ample room for that expansion of rural industries which was so greatly desired.—"Pastoral Review."

1920 COTTON CROP.

In consequence of the favourable price obtained for the 1919 cotton crop and of future prospects, the Minister for Agriculture has decided to increase the advance for the 1920 crop to 3d. per lb. instead of 2d. as heretofore upon cotton in the seed when received at the departmental stores. The balance received from the sale of the lint cotton, less actual cost and charges, will be paid to the farmer upon the completion of the sale. Seed can be obtained free of cost, and railage paid, upon application to the Department.

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The Office of the Secretary of the undermentioned Herd Book Societies is 303 Queen street, Brisbane:—

The Australian Hereford Herd Book;
The Shorthorn Herd Book of Queensland;
The Jersey Herd Book of Queensland;
The Illawarra Herd Book of Queensland;
The Ayrshire Herd Book of Queensland;
The Milking Shorthorn Herd Book of Queensland;
The Holstein-Friesian Herd Book of Australia.

NOTE.—Animals registered in the Commonwealth Standard Herd Book are not necessarily eligible for entry in the Jersey Herd Book of Queensland.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
DAIRY BREEDS.				
AYRSHIRES.				
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
J. H. Paten	Gwandalan, Yandina	6	21	Do.
Queensland Agricultural College	Gatton	4	40	Do.
State Farm	Warren	3	83	Do.
J. W. Paten	Ayrshire Park, Wanora, Ipswich	10	42	Do.
J. H. Fairfax	Marinya, Cambooya	9	55	Do.
J. Holmes	"Longlands," Pittsworth	6	20	Do.
H. M. Hart	Glen Heath, Yalangur	7	21	Do.
F. A. Stimpson ..	Ayrshire Stud, Fairfield, South Brisbane	7	77	Do.
M. L. Cochrane ..	Paringa Farm, near Cairns	5	21	Do.
John Anderson ..	"Fairview," Southbrook	7	34	Do.
JERSEYS.				
T. Mullen	"Norwood," Chelmer	3	20	Jersey Herd Book of Queensland
Queensland Agricultural College	Gatton	2	31	Do.
M. W. Doyle	"Oaklands," Moggill	4	12	Do.
G. A. Buss	Bundaberg	1	15	Do.
R. Conochie	Brooklands, Tingoora	9	21	Do.
W. J. Barnes	Millstream Jersey Herd, Cedar Grove	10	37	Do.
W. J. Affleck	Grasmere, N. Pine ..	6	31	Do.
J. N. Waugh and Son	Prairie Lawn, Nobby	3	28	Do.
W. J. H. Austin ..	Hadleigh Jersey Herd, Boonah	2	11	Do.
State Farm, Kairi ..	Kairi, *viâ* Cairns ..	4	16	Do.
H. D. B. Cox	Sydney (entered in brother's name)	3	16	Commonwealth Standard Jersey Herd Book
GUERNSEYS.				
Queensland Agricultura lCollege	Gatton	2	2	Eligible, but no Guernsey Herd Book of Australia

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
DAIRY BREEDS—*continued.*				
HOLSTEINS.				
Queensland Agricultural College	Gatton	2	9	Holstein-Friesian Herd Book of Australia
George Newman ..	"St. Athan," Wyreema	9	92	Do.
F. G. C. Gratton ..	"Fowlerton," Kingsthorpe	1	15	Do.
R. S. Alexander ..	Glenlomond Farm, Coolumboola	1	3	Do.
Ditto	Ditto	1	..	Holstein-Friesian Herd Book of New Zealand
S. H. Hoskings ..	St. Gwithian, Toogooloowah	..	..	Holstein-Friesian Herd Book of Australia
C. Behrendorff ..	Inavale Stud Farm, Bunjgurgen, Q.	3	9	Do.
E. Swayne	West Plane Creek, Mackay	1	2	Do.
ILLAWARRA.				
A. Pickels	Blacklands Stud, Wondai	4	62	Illawarra Herd Book of Queensland
J. T. Perrett and Son	Corndale, Coolabunia	3	43	Do.
W. T. Savage	Ramsay	2	22	Do.
Hunt Bros.	Springdale, Maleny ..	3	62	Do.
MILKING SHORTHORNS.				
P. Young	Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
W. Rudd	Christmas Creek, Beaudesert	2	10	Do.
A. Rodgers	Torran's Vale, Lanefield	1	9	Do.
W. Middleton	Devon Court, Crow's Nest	3	27	Do.
A. K. Yorksten ..	"Dunure," Miles ..	2	8	Do.
W. H. Francis ..	"Exelawn," Colinton, Brisbane Valley Line	3	5	Do.
BEEF BREEDS.				
SHORTHORNS.				
T. B. Murray-Prior ..	Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
C. E. McDougall ..	Lyndhurst Stud, Warwick (2)	25	100	Queensland Shorthorn Herd Book
Godfrey Morgan ..	"Arubial," Condamine	3	6	Do.
W. B. Slade	E. Glengallan, Warwick	2	20	Do.
HEREFORD.				
A. J. McConnell ..	Dugandan, Boonah	19	36	Australian Hereford Herd Book
E. M. Lumley Hill ..	Bellevue House, Bellevue	45	127	Do.
Tindal and Son ..	Gunyan, Inglewood	50	400	Do.
SUSSEX.				
James T. Turner ..	The Holmwood, Neurum	2	4	Sussex Herd Book of England

The Horse.

PERCHERONS IN U.S.A.

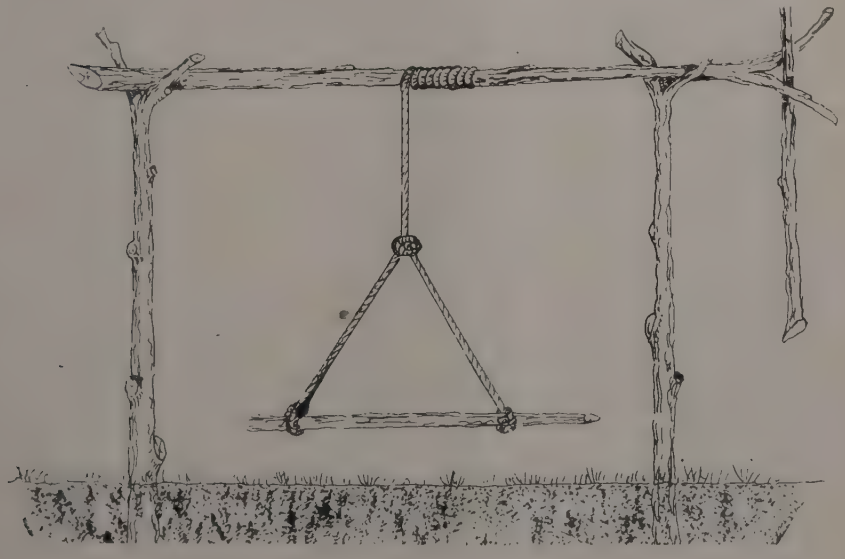
All the important horse-producing States of America, with the exception of Ohio and Texas, now enforce stallion enrolment laws. Collated returns from twenty of these States show that in 1916 the number of stallions registered was 55,806 all told; 41.86 per cent. were described as grade or mongrel stallions, 9.23 per cent. pure-bred stallions of light horse types, and 48.88 per cent. pure-bred draughts. There were in these twenty States approximately ninety mares of breeding age to every stallion licensed for service. It is acknowledged that grade sires should not be used, but the trouble is there are not sufficient pure-bred horses available.

The popularity of the Percheron is illustrated when the returns are analysed. It appears that the registered stallions of this breed numbered 19,199, the next largest being Belgian, with 4,212. Of other breeds there were 2,114 French draughts, 2,006 Shires, 1,275 Clydesdales, and 69 Suffolk Punches. Percherons, in every State, outnumber all the other draught breeds combined. In Iowa and Illinois, the two greatest draught horse producing States, Percherons constitute 60.68 per cent., and 69.32 per cent. of the pure-bred draught sires. In Oklahoma, 85.35 per cent. are Percherons; in Kansas, 77.65 per cent. In the entire twenty States, 66.49 per cent. of the pure-bred draught sires are Percherons, and in ten of the leading States, on which the Percheron Society published similar data two years ago, the percentage which Percherons bear to all pure-bred draught sires has increased from 64 per cent. to over 68 per cent., an increase of more than 4 per cent.

The figures indicate that the Percheron breed possesses outstanding advantages in the eyes of American horsemen. Such an increase, in competition with all other breeds, cannot be mere accident, but is a sure proof of sterling merit.—"Pastoral Review."

FIRST AID TO HORSES.

Mr. H. A. Adams, Yalleroi, commenting upon an article in the October issue of the "Queensland Agricultural Journal" on "First Aid to Horses," sends us the accompanying sketch of a bush sling which is easily made and effective. The sling is made of three forks, and is operated by a short sapling. All that is required is a large flour-bag, a chain, and a piece of rope or wire. The bag is placed under the stomach of the animal, and the two forks are put up, one or each side of where the horse is lying, the bag being put under him. He comes up in quick time. He had often used this in time of drought, and considers that there is nothing better, as usually the forks can be got close at hand and the animal can be fed and watered in the sling. One man can make and operate the whole thing. Mr. Adams's experience will doubtless be useful to many who are far away from veterinary assistance.



Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, OCTOBER, 1919.

In spite of the hot weather prevailing during the month, the output of eggs has been very satisfactory. The score of R. Holmes (B.O.) of 1,008 eggs in seven months is certainly a fine achievement. This same breeder's E bird finished a sequence of 90 eggs, making the break on the 24th of the month. E. M. Larsen's C, which broke on 26th September, after a continuous run of 64, has again not missed a day to the end of the month. R. Burns's D, which missed on 2nd September, after a run of 39, has also continued to the end of October without a miss. The above results are phenomenal, especially as the weather at present is not such as one would expect to permit exceptional scoring in the heavy breeds. The second position in the heavy breeds is being fought for by the 2nd, 3rd, and 4th pens, only ten eggs separating them. The birds in all three pens look fresh. The pens owned by R. Burns and E. F. Dennis each laid 35 eggs in the last seven days, and E. M. Larsen's 36 for the same period. The laying in the light breed single pens has been very good; only one pen, taking the birds as groups, failed to lay over 130 eggs for the month. No sequences of note have been made by any of the light breed single hens. The laying in the section for the leading pens has been, for the last seven days, as follows: J. M. Manson, 35; T. Fanning, 29; W. Hindes, 28. During the last week broodies have been very troublesome, especially in the heavy groups. There are also more broodies among the light breeds than one would like to see. Three deaths occurred during the month. On the whole the birds look bright and healthy, a state which has been largely brought about by the abundance of green feed supplied to them. The following are the individual records:—

Competitors.	Breed.	Oct.	Total.
LIGHT BREEDS.			
*J. M. Manson	White Leghorns ...	156	953
*T. Fanning	Do.	165	936
*W. Hindes	Do.	140	913
*Dixie Egg Plant	Do.	138	887
*E. A. Smith	Do.	152	876
*Dr. E. C. Jennings	Do.	146	846
*G. W. Hindes	Do.	141	832
*Haden Poultry Farm	Do.	139	828
*Range Poultry Farm	Do.	141	813
*Quinn's Post Poultry Farm	Do.	153	812
*B. Caswell	Do.	147	786
J. H. Jones (Toowoomba)	Do.	142	781
S. McPherson	Do.	124	779
*W. Becker	Do. ...	146	774
*C. P. Buchanan	Do.	136	772
*L. G. Innes	Do.	158	767
*H. Fraser	Do.	138	766
G. Williams	Do.	119	748
G. J. Byrnes	Do.	121	741
*J. J. Davies	Do.	143	738

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Oct	Total.
LIGHT BREEDS—*continued.*			
*Mrs. L. F. Anderson	White Leghorns ...	137	737
W. A. Wilson	Do.	128	727
S. W. Rooney	Do.	132	723
H. A. Jones (Orallo)	Do.	120	719
*W. Lyell	Do.	125	715
*Thos. Taylor	Do.	143	709
*Mrs. A. G. Kurth	Do.	142	707
*Mrs. R. Hunter	Do. . ..	131	683
Geo. Trapp	Do.	135	672
G. H. Kettle	Do.	130	668
B. Chester	Do.	140	659
Mrs. N. Charteris...	Do.	123	634
*O. W. J. Whitman	Do. ..	137	631
C. A. Goos	Do.	125	630
N. A. Singer	Do.	134	626
H. O. Jones (Blackstone)	Do. ...	111	625
Oakleigh Poultry Farm	Do.	108	620
J. W. Newton	Do.	132	601
R. C. J. Turner	Do.	96	572
W. Morrissey	Do.	114	565
J. H. Dunbar	Anconas	110	553
HEAVY BREEDS.			
*R. Holmes	Black Orpingtons ..	150	1,008
*E. F. Dennis	Do.	157	936
*E. M. Larsen	Do.	152	929
*R. Burns	Do.	152	926
*W. Smith	Do.	144	879
*A. E. Walters	Do.	140	869
Geo. Nutt	Do.	111	860
*A. Shanks	Do.	118	837
*Kelvin Poultry Farm	Plymouth Rocks ..	130	836
*E. Morris	Black Orpingtons ..	133	817
*Nobby Poultry Farm . ..	Do.	122	805
*D. Fulton...	Do.	112	754
*T. Hindley	Do. .. .	131	752
*Jas. Ferguson	Chinese Langshans ..	123	745
*Mars Poultry Farm	Black Orpingtons	154	731
*W. H. Reilly	Do.	115	719
*H. Puff	Rhode Island Reds .	96	686
Burleigh Pens	Do.	103	672
R. B. Sparrow	Do.	119	672
*F. W. Leney	Do. ...	120	660
A. Homan	Do. ..	102	646
*T. B. Barber	Do. ...	112	631
J. A. Cornwell	Do. . .	118	586
C. H. Singer	Do. ..	99	579
A. Gaydon	Do. ..	109	552
H. Ashworth	Do. ..	108	549
Total	..	8,707	49,760

* Indicates that the pen is being single tested.

RESULTS OF SINGLE HEN PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
J. M. Manson	162	151	164	160	157	159	953
T. Fanning	168	169	154	163	150	162	936
W. Hindes	165	157	150	141	150	150	913
Dixie Egg Plant	138	143	157	166	138	145	887
E. A. Smith	142	141	162	144	133	154	876
Dr. E. C. Jennings	145	119	145	138	137	162	846
G. W. Hindes	150	131	152	135	124	140	832
Haden Poultry Farm	153	154	144	134	112	131	828
Range Poultry Farm	115	139	153	154	117	135	813
Quinn's Post Poultry Farm	129	141	148	152	123	119	812
B. Caswell	110	76	132	160	170	138	786
W. Becker	160	137	150	117	84	126	774
C. P. Buchanan	113	150	117	121	128	143	772
H. Fraser	104	140	150	131	102	139	766
L. G. Innes	105	149	107	140	142	124	767
J. J. Davies	109	115	131	135	125	123	738
Mrs. L. Anderson	132	143	108	118	110	126	737
W. Lyell	110	126	138	109	115	117	715
Thos. Taylor	138	98	97	139	139	98	709
Mrs. A. G. Kurth	148	124	128	115	79	113	707
Mrs. R. Hunter	106	108	124	120	113	112	683
O. W. J. Whitman	98	132	98	93	110	100	631
HEAVY BREEDS.							
R. Holmes	171	171	187	152	193	134	1,008
E. F. Dennis	175	137	166	152	131	175	936
E. M. Larsen	161	165	162	143	160	138	929
R. Burns	159	142	155	193	140	137	926
W. Smith	119	166	145	133	166	150	879
A. E. Walters	149	140	155	140	131	154	869
A. Shanks	86	108	173	143	153	174	837
Kelvin Poultry Farm	177	120	130	120	151	138	836
E. Morris	137	130	148	142	163	97	817
Nobby Poultry Farm	128	117	118	136	157	149	805
D. Fulton	121	125	132	116	139	121	754
T. Hindley	151	140	98	137	107	119	752
Jas. Ferguson	132	165	105	102	121	120	745
Mars Poultry Farm	102	155	156	88	90	140	731
W. H. Reilly	107	101	143	137	101	120	719
H. Puff	133	97	118	135	96	107	686
F. W. Leney	82	109	125	156	90	98	660
T. B. Barber	96	106	100	105	124	100	631

CUTHBERT POTTS,
Principal.

FOWLS PICKING FEATHERS.

A correspondent at Hughenden writes asking the cause of fowls picking feathers out of each other. Mr. Beard, Poultry Instructor, says that the causes of the vice (scarcely a disease) are various.

Sometimes it is due to parasites or vermin which the birds pick at. More often, the cause can be attributed to improper conditions under which the birds are kept. Overcrowding and insufficient exercise may start the habit. It is a very common complaint amongst birds that are kept in small yards, and rarely occurs amongst flocks that have free range.

Insufficiency of green stuff or animal food may also be the cause; but, in most cases, it is impossible to correctly tell what first started the habit. Whatever the cause may be, in most instances the poultry keeper has himself to blame. Had the opportunity not been there, the birds would not have developed the habit.

TREATMENT.

Make an ointment of 1 lb. of lard and one teaspoonful of extract of aloes. Rub well into the feathers and parts affected, or apply with a sponge an infusion of quassia over the feathers. If one dose does not stop the feather eating, repeat it after a few days. Give more animal food, and plenty of green stuff, and add flowers of sulphur to the mash—one tablespoonful to each twenty fowls, and provide plenty of exercise.

SUNSTROKE AND HEAT APOPLEXY AMONG MUSCOVY DUCKS.

By R. T. G. CAREY, Beerwah.

These two prevailing calamities, which frequently occur among the young ducklings, are generally the result of want of precaution to erect suitable sunshade; the neglect of which gives rise to so much trouble that the death rate may be appalling, and one cannot afford to lose any of the youngsters, which cost so much both in labour and feed. Now that the Christmas market is at hand, and time fast flying, the fattening foods used to rear them up to market standard create much animal heat; therefore, when a sultry day or a heat wave arrives, these quaint webfooted birds very often get sunstroke or heat apoplexy.

As the muscovy duck season is now well on, mostly every duck should have her family; but as she is an indolent, forgetful, heedless parent, she never considers how her ducklings should be cared for, but allows them to roam and bask in the fierce sun-rays; and it is while thus stretched out and asleep that the damage is done. Therefore, when the attendant approaches them, some are unable to rise, some get up staggering, and others are symptomatic.

In the case of sunstroke, pick up the dear little one and pour cold water on its head. Do that for about ten minutes, then put it into a cool, dark room, and give plenty of nice cool water; feed lightly for a few days, when it ought to get well.

In the case of heat apoplexy, give the youngster a cool bath on the head, or let the tap run gently on it. Place the patient in a shady, cool pen for several days, after which feed with plenty of nice, fresh green herbs or new lucerne.

These webfooted fowls have few diseases, but are liable to contract them. "Prevention is better than cure" is a good old adage. The best antidote for all diseases is thorough cleanliness, with good, wholesome food. This reduces to a minimum any source likely to cause epidemics. There are, however, some ailments that do come on, notwithstanding all care and attention given.

Take pneumonia, caused from exposure to sudden chilly weather, dirty accommodation, or foul pens. As ducklings create great heat when closed in pens or huts, a poisonous vapour arises, the "flu" sets in, and unless diligently watched it wipes out the flock.

To dilate on all ailments would be superfluous, therefore the "axiom of work" is clean water, green food, absolute cleanliness of coops, pens, houses, and every appliance. A plentiful use of disinfectants and some knowledge and brains put into use will keep the principal disease away, and your muscovy duck will be a source of income and pleasure both to yourself and it.

QUEENSLAND WOOL IN LONDON.

The "London Times" states that at the October wool sales in London, Sydney greasy merinos sold from 30d. to 71d.; locks and pieces, 46½d. to 47½d. Queensland scoured merinos sold up to 104d., which constitutes a record. Victorian scoured crossbred (best) brought 75½d., and New Zealand greasy crossbreds sold at 40½d.

The Orchard.

LEMON GROWING AND CURING.

There are many old-time remedies for the ravages of insects, fungoid diseases, &c., in the orchard. It does not follow that, because a remedy is fifty years old, it must necessarily be valueless when compared with more modern discoveries. Our methods of irrigation, for instance, are much the same as we find described in Virgil (Georgic II.). That old agriculturist wrote:—

"What shall I say of the man who, having scattered the seed, follows up the sown field, and heaps up the adjacent piles of ill-productive soil? Then leads the river and ductile streams over the sown land, and when the burnt-up field is hot with dying herbage, behold he brings the wave from the brow of a hilly tract. It, in falling, stirs up a hoarse murmur from the smooth stones, and cools the parched-up field with its springs."

It is a far cry from Virgil's time (70 to 19 B.C.) to the present day, but the cry for irrigation, whether by rainfall or by artesian bores or wells, is the same to-day as in the old philosopher's time.

In 1897, Mr. W. S. Williams, of Victoria, read a paper on "Lemon Growing and Curing" at the conference of fritgrowers in Brisbane. In the course of his remarks, he dwelt on the importance of irrigation.

He had early found, even so far south as Melbourne, that for the successful culture of lemons it was absolutely necessary to have the command of water, as there is generally a short portion of each year when the trees are liable to suffer from want of moisture; and, if water is not at hand when wanted, they suffer in their growth and bearing.

During some abnormal seasons it is not required, but we never know until the time comes, and when the leaves begin to curl it is certain they want a drink to carry them forward, and if this be not supplied it means all the difference between loss and profit.

Any person choosing a site for growing lemons should see that he choose one where he can have a supply of water. The method he adopted in applying water to the trees was to plough furrows on each side of them both ways, and run them full of water as evenly as possible, and next day, when the water had soaked into the soil, to run the disc over to fill the furrows, and leave the soil loose. A fair watering would carry the trees over a month at least in the driest time.

The most suitable soil for lemons he found to be a deep, fine loam, with clay subsoil, which should be under-drained and subsoiled to a depth of not less than 12 inches, then left to lie fallow through the summer. In the autumn the land should be well worked and fined with the disc harrow, and further fined and harrowed with the Acme harrow, then gathered in lands of 20 feet with the plough, and finally harrowed lengthways to bring it into good tilth. If the land is stubborn to break the roller may be used with advantage. He held that 20 feet by 20 feet was the best distance at which to plant, at all events in his district, the distance being accurately measured by means of a strong wire marked at every 20 feet, stretched across the land, and the trees planted at each mark. Care must be taken in planting not to plant deeper than the nursery mark, as the top roots should only just be covered with soil, which should have a decided fall from the neck of the tree; otherwise they may contract collar rot through water lodging round them.

Regarding shelter, to produce a good percentage of clean-skinned fruit the trees must be sheltered from heavy winds, either naturally or artificially.

In undulating country, lemon trees should not be planted in the gullies, as the frost would destroy large numbers of both trees and fruit.

For artificial shelter, nothing beats the *Pinus insignis* planted 20 feet apart in the rows, and the rows 10 feet apart. In six years they will come together and form a perfect breakwind 20 to 30 feet high. A double row of loquat trees also makes a good break. For manuring, the most useful is a blood manure, superphosphate, and a small portion of kainit, used alternately. Stable manure, where procurable, tends to keep the ground loose among the trees. Peas, sown in autumn and ploughed in early in the spring, are very beneficial, as they add nitrogen to the soil and keep it open. The soil should never be allowed to set around lemons. Mulching outside of the drip of the trees tends to bring the roots too near the surface, and thus interferes

with working the land during summer. After any fall of rain of any consequence during summer, the land between the trees should be gone over with a disc harrow or cultivator, and loosened to a depth of 3 or 4 inches, and underneath the trees the long-handled Dutch hoe should be used, so that the moisture may be retained in the soil. In a well-kept orchard, the foot should always sink in the soil, and no weeds ought to be seen during the summer.

Is there any general system of pruning lemon trees? Mr. Williams said he had searched, and inquired in every place he had visited where citrus fruits are grown, for a system, but had found that no general system was recognised. Some growers never cut a tree under any circumstances, and maintain that it is wrong to do so. Others, again, trim the tops to give the tree symmetry and balance. Such plans may do for some years, but ultimately the trees suffer and die a premature death, as the lemon, as a rule, is a very heavy bearer, and, if left to Nature with regard to pruning, it kills itself by bearing. After some experience, Mr. Williams came to the conclusion that lemon trees should be systematically pruned. The best time for the operation is in the spring, and by what he terms "back-pruning"—that is, beginning in the centre of the tree, and removing a portion of the off-shoots from each limb outwards, always taking care to leave foliage enough to shade the inside of the tree. A main point is to keep the tree fairly balanced by removing strong stem shoots, and keeping the tree growing fairly evenly all over, for if one portion is allowed to take the lead, it does so at the expense of the other portions of the tree, which, besides rendering it unsightly, also injures its bearing powers.

If the system he advocated were followed out, the tree would receive proper light and air, it would be less liable to insect pests, and the fruit would come more even and clean inside and outside alike, besides adding very materially to its length of life. On the gathering and curing of the fruit, Mr. Williams said that lemons, to have the best colour and quality for table use, should be cut off the tree with a proper fruit-cutter, and handled with great care, or else a large percentage will spoil in curing. They should be taken off when the fruit is changing colour, and left for a day or two in the open air before putting away. They should then be placed in trays in single layers, and placed in a dry, dark collar of even temperature, not at any time over 60 degrees F. The trays may be placed on each other to any convenient height, and in three weeks should be moved and examined and wasters removed. In the course of a month, they should be gone over again, when all that are likely to go wrong will have done so. The lemons are then perfectly cured, and should be of a beautiful, bright-yellow colour.

The cells are decomposed, and give out the juice freely and of far better quality than if taken off the tree direct. The lemons can then, if wrapped in tissue paper, be sent any distance if kept moderately cool and dry, or stored to meet the charges in the market. Mr. Williams incidentally mentioned that he has frequently kept his lemons twelve months with very little change after the first seven or eight weeks.

PRESERVING SMALL LOTS OF GRAINS FOR SEED PURPOSES.

It is well known that unless special provision has been made in the way of air-tight tanks, fumigation, &c., it is a most difficult matter, on the coast, to keep seeds such as cowpea, grain, sorghums, maize, &c., free from weevils.

It has been found that weevils cannot multiply in grain unless it contains a certain percentage of moisture. In wheat, for instance, there has to be at least 10 per cent. present. When harvesting it invariably contains from 6 to 7 per cent. moisture, and is therefore weevil-proof.

A simple method of keeping the moisture content under weevil requirements is to use a vessel or container as air-tight as possible, such as a tank, petrol tin, old cream can, &c., and when storing seeds to include a quantity of freshly burned lime. In the event of the container not being insect-proof, the bags containing the seeds should be covered right over with the lime. In fact, the lime can be mixed with the grain without a detriment. In order to ascertain whether lime would be injurious to vitality, a number of maize cobs and grain sorghum heads were buried in partly air-slaked lime in the month of June. A vitality test was carried out in September, the maize giving 100 per cent. and the sorghum 98 per cent. germination. A further test was made at the end of December with practically similar results.

The cost of the lime used in the preservation of perishable products would be almost nil, as it can afterwards be applied to the land with, in most instances, considerable advantage.—"Journal of the Jamaica Agricultural Society."

Tropical Industries.

THE CULTIVATION OF SUGAR-CANE IN QUEENSLAND.

By HARRY T. EASTERBY, General Superintendent, Bureau of Sugar Experiment Stations.

PART V.

CANE CULTIVATION ON OLD LANDS—*continued.*

PLANTING, SUBSEQUENT CULTIVATION, AND RATOONING.

Having got our soils in perfect tilth as previously described, we must now turn our attention to the planting, upon which so much depends. The greatest supervision should now be exercised, so that only good, sound plants, free from disease, are selected. Even if it is necessary to pay a somewhat higher rate for good plants from outside, it is well worth while. Generally speaking, plant cane from 10 to 12 months old, or first ratoon of the same age, should be taken. Now that canes are paid for on analyses, it is perhaps hardly needful to point out, except to beginners, that only good sugar-producing varieties should be used. If the time of planting corresponds to that of harvesting, it is a good plan to cut as many top plants as possible from the best of the cane going to the mill. These are undoubtedly superior to the parts of the cane situate lower in the stick, although it is claimed that butts also make very good plants. The top plant, however, has the minimum of sugar and contains nitrogenous bodies and salts which form food material for the plant during its early stages of growth. Top plants cannot always be procured, and it is then usual to cut up the whole stick for plants. It is preferable for a farmer to change plants with a neighbour rather than to grow cane continually from his own seed. Cane should also be brought from colder to warmer climates and from hillsides to lower levels, when it is invariably found to do well.

The best width of row has been found from numerous experiments in Louisiana, Hawaii, and Queensland to be 5 feet, though in the case of a straight growing cane, such as D 1135, this could be reduced to 4 feet 6 inches. The drilling is best accomplished by means of a double mouldboard or drill plough. The plough should make a good wide drill about 9 to 10 inches deep in the loose soil. Where the cultivation has been deep and good, this will leave a few inches of soil for the plant to lie on. Some farmers believe in going very deep with the plough, and cleaning everything out to the hard bottom, but our experience has been that better results are obtained where a certain amount of loose earth is left at the bottom of the furrow. Moreover, in a dry time, when planting by hand, there is usually a certain amount of moisture in this loose soil into which the plants can be pushed down, and so give them a much better opportunity to strike more rapidly. Three-eye plants are almost universally favoured, but the distance at which the plants are to be spaced apart in the row varies greatly in the different districts. At

Bundaberg the plants are often placed 12 to 18 inches apart, while on the Herbert River the planting is almost continuous. A good average distance for the spacing, and one we have found to give good results, is 6 inches. The plants are usually put in about 9 inches deep when planting by hand, and covered with from 2 to 4 inches of soil—2 inches when conditions are very moist, and 4 inches when they are very dry. When planting by hand, the cane sets should be laid in the ground with the eyes at the sides if possible. The cane-planting machine is now coming into great favour, and, while spacing cannot be carried out so evenly by its means, it puts the plant well down into the moist soil. It is a great labour saver, and many types of machine are now upon the market.

The subject of applying manures to the crop will be left till later on.

As soon as the cane is up about 6 inches, the subsequent shallow cultivation should commence, and this, if properly done, is a factor which materially contributes to the after success of the crop.

CULTIVATION.

Shallow cultivation, after the crop is up, conserves moisture. One of the world's leading authorities upon the culture of cane (Professor Stubbs, of Louisiana) says:—"The cultivator should be run as frequently as possible, so that a thin layer of earth is removed from the great body of soil and laid as a mulch upon the surface. In this way, the continuous upward movement of moisture through the soil into the air is checked just below the surface, so that roots of plants can appropriate it. The finely divided earth on the surface has the power of attracting hygroscopic moisture from the air—a not insignificant fact in times of drought with heavy dews at night. The question may be asked: 'Which best promotes the above advantages? The cultivator, which stirs only to a limited depth and never inverts, or the plough, which runs 6 to 12 inches deep, completely inverting the soil and burying plant foods and ferments beyond resurrection for the growing crop?' The plain and candid reply is—the cultivator. Again, but little stress has been laid upon the damage done by the frequent cutting of the cane roots by ploughs, a damage often fatal to good crops." So impressed were Louisiana farmers by this reasoning that they, many years ago, abandoned the cultivation of cane between the rows with the plough.

Professor Hilgard ("Soils") says:—"The loose tilth of the surface, which is so conducive to the rapid absorption of the surface-water, is also, broadly speaking, the best means of reducing evaporation to the lowest possible point. . . . It is true that relatively coarse compound particles are incapable of withdrawing capillary moisture from the dense soil or subsoil underneath, just as a dry sponge is incapable of absorbing any moisture from a wet brick, while the dry brick will withdraw readily nearly all the water contained in the relatively large pores of the sponge. A layer of loose, dry, surface soil is therefore an excellent preventive of evaporation, and to moderate the access of excessive heat and dryness to the active roots."

This method of cultivation is practised at all the Experiment Stations, the implement in use being a Planet Junr. cultivator, fitted with broad sweeps or hoes. Uniformly good results have followed this procedure.

While the use of a disc harrow may be permitted during the early stages of the crop, especially when some form of drill cleaner is pulled behind, its use should be prohibited directly it is found that the young cane roots (which subsequently begin to stretch out laterally) are being cut. There are now many devices in use in the cane fields to obviate the labour of "chipping" or weeding the drills by hand. In some of these a form of bent harrow is pulled behind the disc harrow or a two-row cultivator. This bent harrow sits in the drill, and if the weeds are taken when they are small they can nearly all be removed in this way. Others use a light form of triangular harrow in the drill, such as a strawberry cultivator. Special forms of implements for cleaning the interspaces and the cane drills at one operation are also to be procured. With a little ingenuity, however, something may easily be devised to clean the drills, but this must always be done while the weeds are small. If they are left too long, there is nothing for it but expensive hand hoeing, and in any case there is always more or less of this to be done, but a great deal of it can be saved by taking the weeds in time. The cultivator should be run regularly through the cane whether there are weeds or not, so as to ensure the crop getting all the benefits from the cultivator and to conserve moisture during dry times.

If the above instructions have been followed, the season favourable, and the land of fair average quality, a heavy crop of cane should result. This on old lands is usually easily harvested, as facilities in the way of tramlines are, as a rule, provided. The cost of cutting is of course governed by the Award of the Arbitration Court for the time being. Farmers should be particular in having their cane cut to the ground level, or slightly below it, because if this is done the cane ratoons very much better. Unsightly stumps of cane sticking up above the soil for 3 or 4 inches or more should be strongly condemned. The burning of cane, unless it is absolutely necessary, should not be allowed either, as it entails a loss to both grower and miller.

When the cane is harvested it is necessary to turn to the ratooning of the cane—*i.e.*, the second growth of a crop from the stools of the first or plant crop.

DISPOSAL OF TRASH.

As soon as the cane is cut the farmer must make up his mind as to what he is to do with the trash or dead leaves and tops from the preceding crop. The tops whilst green are to a large extent used for forage purposes, so that, as a rule, there are not many of these left. The trash is usually burned in Queensland, and there is a good deal to be said in favour of this method, provided humus is restored at intervals by the growth and ploughing under of a good green manure crop. Trash often forms a harbour for vermin, pests, and fungous diseases of many kinds. It has been claimed that the increase in a ratoon crop, due to excellent cultivation, rendered possible by burning the trash, will more than compensate for the fertilising ingredients lost in burning.

PLATE 26.—BURNING CANE TRASH.

A method of ratooning used at the Mackay Sugar Experiment Station has given large yields of ratoon crops. It is as follows:—

It is believed that the best method of securing large yields of ratoon cane is to adopt the following procedure:—Immediately the trash is burnt, open up the middles of the rows to a depth of 9 inches with the swing plough; next subsoil these two furrows so that a further depth of 6 inches is thoroughly stirred. Next plough away from the cane rows on to the middles and again follow with the subsoiler. By this means the whole of the ground between the rows has been moved and stirred to a depth of 15 inches; and the benefit to the ratoons in thus breaking up the hard ground and letting in air and sunlight is difficult to over-estimate. Subsequent shallow cultivation with broad hoes should now be practised frequently, in the same manner as recommended for the plant crop.

The results obtained at the Experiment Station, due to this method of cultivating ratoons, are detailed in the table below:—

Crop.	Yield of Cane per Acre where the Ground between the Rows was Ploughed and Subsoiled.	Yield of Cane per Acre where the Ground between the Rows was only Ploughed to 8 inches.
	English Tons.	English Tons.
First Ratoons	38·9	27·0
Second Ratoons	31·3	19·2
Third Ratoons	20·4	9·91

These experiments were not fertilised.

By adding manures as hereafter mentioned still larger results have been obtained. The usual methods practised by farmers, however, do not make use of the subsoiler. The following are favourite ways of ratooning:—

(*a*) Trash burnt and four furrows ploughed between cane rows. Land levelled down by use of tyne harrows or cultivator.

(*b*) Trash burnt, procedure same as above, but only three furrows ploughed between rows.

(*c*) Trash burnt and ground cut up first with disc harrows cross-ways. Then use of plough between rows followed by tyne harrows cross-ways.

(*d*) Trash burnt, four furrows ploughed between rows and skeleton plough used in furrows next to cane.

(*e*) Trash burnt and land treated with spring tooth cultivator or a grubber instead of being ploughed.

(*f*) Trash left and rolled in each alternate interspace. Every other interspace well cultivated with the plough. In this way each row of cane has one side cultivated and one side uncultivated, but covered with trash.

(*g*) Trash left and cane allowed to volunteer without any cultivation at all. This method is sometimes advantageous in a droughty season, but is not to be recommended as a regular thing.

All these methods are in use, or some variation of them. In the writer's opinion the best cultivated ratoons (other things being equal) give the highest yields, but it is often a question of cost.

[*To be continued.*]

Dairying.

RATIONS FOR A DAIRY COW.

Mr. A. E. Graham, Government Dairy Expert, in reply to a correspondent asking for advice as to the best-balanced daily ration for a dairy cow, gives the following proportions of wheaten meal, lucerne chaff, and molasses, which will fairly well meet the case of cows which have been milking for three months and are in good condition:—

Ration No. 1—
5 lb. of wheaten meal.
10 lb. of lucerne chaff.
3½ lb. of molasses.

Ration No. 2—
2½ lb. of wheaten meal.
14 lb. of lucerne chaff.
3 lb. of molasses.

Ration No. 3—
7½ lb. of wheaten meal.
7 lb. of lucerne chaff.
1½ lb. of molasses.

The purpose of the alternative ration given is to allow you to select whichever food is available at the cheaper rate to as full a degree as possible.

The rations given are somewhat faulty, as they fail to provide an adequate amount of dry matter required by a cow. It is considered, however, that the animals will be running in a paddock, and no doubt will pick up some roughage, even if the supply of same is limited.

An equally good ration may be provided by the substitution of bush hay or any clean white straw for the molasses. The complement of hay or straw necessary will be slightly in excess of the amount of molasses stipulated.

REMEDY FOR A SELF-SUCKING COW.

In connection with the steps to be taken to prevent a cow from sucking, it must be first ascertained whether the cow sucks her teats while lying down or in a standing position. (Cows may suck in either position.)

In the latter case, a moderately efficacious means of overcoming the trouble is to affix upon the cow a headstall with a nosepiece comprised of stout leather; through the leather ordinary 2½-inch wire nails are driven, the pointed ends being exposed, and, to keep the nails from retracting, a strip of tin is fastened to the leather band over the heads of the nails, the points of which may be sharpened, if necessary, with a file or upon a grindstone. The points of the nails prick the hide of the cow whenever she attempts the sucking.

In instances where a cow sucks her teats while lying down, the above remedy may not always prove satisfactory, as frequently, when the animal is lying at rest, the teats may be sucked by the cow without bringing the points of the nails into contact with her flanks. To meet such cases, take a triangular-shaped piece of light wood, cut off the apex several inches down the triangle, and hollow the remaining piece of wood directly below the cut, leaving the edges of the wood available to fit into the nostril cavities, and thereby gain support for the piece of wood which falls over the mouth of the animal and debars her from sucking, her at liberty to graze and take water. (*See rough sketch in margin.*)

If heavy wood is used, or the points of wood which act as a hinge are left in a rough condition, the nose of the animal may become chafed as a consequence.

Many experienced dairymen remove from the herd any animal that develops the habit of "sucking," but possibly there are exceptional cases where the application of remedial measures is warranted.

Forestry.

CONSERVANCY OF OUR FORESTS.

By THE EDITOR.

In view of the reckless disregard of the future of the timber supplies of our forests in all parts of the State by those engaged in the sawmilling and exporting of our most valuable timbers, we are led to repeat what we wrote upon this subject nearly twenty-five years ago, drawing attention to the apathy with which the bulk of the population, who are not immediately interested in the timber trade, view the question of a future supply of one of the most important of our natural products. The reason for this culpable disregard of the future lies in the fact—first, that the generality of people are ignorant of the value and extent of our forests from a climatological point of view; secondly, from a hazy idea that our supplies of timber suitable for building purposes, for railway sleepers, wood paving, piles, telegraph and telephone poles, fencing material, &c., &c., are inexhaustible.

Having had considerable practical experience in the timber trade, timber-getting, &c., in Victoria, and subsequently in the early days in Queensland, I am in a position to prove, not only that our timber supplies are not inexhaustible, but that many districts have become absolutely denuded of all timber suitable for the above purposes, and that, in some instances, even timber for firewood is no longer obtainable. Whilst most countries under European rule have been, previous to the war, expending vast sums of money in not only preserving existing forests, but also in re-afforesting large areas already denuded of timber; whilst in the United States, many millions of acres are reserved as State Forests: we, in Queensland, appear to have been, and still to be, bent upon getting rid of these valuable assets as quickly as we possibly can, never stopping to think of the future or of the trouble which must inevitably follow such a mistaken policy. Yet, all the while, Nature herself is trying to teach us the lesson that forests are an absolute necessity for our well-being.

A constant warfare is going on between man and Nature, in trying, the one to subjugate the forests, the other to assert the imperious necessity for their continuance. If man were to desist from the struggle, the forest would predominate almost all over the world. We can well imagine the forests of the prehistoric world, before man became a denizen of its densely timbered solitudes.

Palæo-botanists have given us a very fair idea of the trees of our earth in primeval times. The whole face of the dry or swampy land was occupied by enormous trees which have only diminutive representatives at the present day. Lycopods, which now only grow to the height of, at most, 3 feet, then attained an altitude of from 80 to 100 feet. For countless ages, these dense forests grew and flourished, and then were overwhelmed by some convulsion of Nature, to be buried beneath hundreds of feet of rock, sand, or clay, until once more brought to the surface in the shape of coal, whilst fresh forests grew above them to be submerged in their turn. Still, Nature kept on the struggle, and proved victorious.

We may see the same struggle going on to-day under our own eyes. If we fell a dense scrub and burn off every stick of timber, and take out every stump, and then leave it to itself, what do we observe? That in a few years, a new scrub clothes the denuded patch with a dense growth of, generally, dissimilar timber, which obliterates all traces of man's handiwork. This is particularly plainly to be seen in Papua, where the writer saw, in the midst of a dense scrub, considerable areas of a totally different kind of vegetation, the trees being apparently all of the same age. These were explained as plots which had long ago been cleared and cultivated by the natives, and finally abandoned, with the above result.

In some more densely peopled countries, man is generally the conqueror, and that to his own detriment. He has employed his art to turn vast stores of timber—the growth of ages—to manufacturing uses. Had he stopped here, all would have been well. Forests are made for man's use; they are intended to be cut down as required. But in his insatiable greed and want of foresight, he has destroyed the timber on large areas of once fertile country, and, as a natural consequence, the land has become, in many cases, unfit for agriculture or pastoral occupation. The covering of timber preserved the soil from being baked by the sun, as well as from being frozen up by the icy blasts of winter. The falling leaves and rotting trunks formed a rich humus for the growth of succulent grasses and herbs, whilst the roots of the trees, assisted by those of the herbage, held the soil together, and the heaviest rains and floods were powerless to carry away the fertile parts of it, and thus there was always

a continual supply of grass on the forest lands for the fattening of stock, and whatever was required for cultivation purposes, was nourished, as stated, by the fallen leaves of many centuries, and the crops were sheltered from wind storms by the surrounding forest.

Now, see what man has accomplished by his ruthless destruction of the forests and scrubs. He has laid bare the slopes of the hills where, previously the fertility was regulated by the gentle flow of rainwater as it found its way towards the level country. There is nothing now to impede the rush of water descending in torrents from the hills and mountains. The surface soil is disintegrated and carried down on to the low, fertile lands, often covering them up with a mass of sand, shale, and other rocks, and thus rendering them, in their turn, useless for cultivation; and the result of this destruction of the forests has been that where we once saw smiling fields and luxuriant crops, there now only remains a barren wilderness of rock and sand, with a scanty covering of almost useless grasses and herbs. The cleared scrubs on the hillsides gradually lost their upper stratum of humus, and the crops, becoming scantier year by year, indicate the mischief which has been done.

Now men are slowly awakening to the necessity for reproducing these lost forests artificially, and of conserving those still remaining, by legislative action.

In Queensland, we are still in the destructive stage, although something has in the past, been done by the Government to protect and replace the valuable timber trees of our forests and scrubs. Here and there, attempts have been made by private individuals to preserve and replant some of the indigenous scrub timbers. The writer, in 1879 planted a few hundred young red cedar trees in the scrub on his property from which the railway station, "Forest Hill," near Laidley, takes its name. That property fell into other hands, and to-day the scrub and the planted trees no longer exist. But for one tree planted, there are 10,000 destroyed by axe and fire, and this senseless destruction will go on until more attention is paid to the warnings and instructions so frequently issued by the Department of Agriculture, and by the Forestry Department of Queensland. Reports on the subject by such Government officials as Mr. P. McLean, when Under Secretary for Agriculture, the late Mr. P. MacMahon (a former Curator of the Brisbane Botanic Gardens), Mr. A. McDowall (formerly Surveyor-General), and other experts, in 1890, are still deserving of thoughtful consideration, dealing, as they did, with the whole subject of Forestry.

Take, as an instance, what Mr. McDowall said on the shameful waste of our timbers, and the effect of their destruction on the country:—

"It can hardly be questioned that the time is approaching when the wholesale destruction of timber in many parts of the colony—much of it of a wantonly wasteful nature—will be severely felt. Suddenly, when the depredations of a careless population have produced the inevitable result, the subject of forest conservancy will assume a prominence not yet accorded to it, and it will be a matter of general wonder that our shortsightedness did not allow us to realise that destruction without replenishment must lead to scarcity."

As we have said, "Forests were made for the use of man," and, if properly managed, a perpetual supply of timber for all purposes can be maintained. This was practically demonstrated by a firm of sawmillers who held large timber selections in the Noosa district at Lake Cootharaba (McGhie, Luya, and Company). These far-seeing timber merchants kept up a regular supply of kauri and hoop pine by judicious, systematic thinning. The scrubs on their properties contained great quantities of these valuable soft woods, and, to ensure constant supplies, the land was divided into large blocks, of which one was culled of all pine timber of a certain diameter. When this first block was worked out, the next was taken; then, the others in rotation, until, at the end of five or six years, a large quantity of the pine in the first block, left untouched after the first thinning, had reached the stated diameter, and was ready to be again thinned. Meanwhile, all the young saplings were coming on for use in after years, and thus the supply might be called perpetual.

To-day most of this land has been cleared for agricultural purposes, and the timber trade, once so prosperous there, no longer exists. It is probable, although the best authorities are not agreed upon the subject, that to the wholesale destruction of our forests and scrubs may be attributed the lessened rainfall and consequent drought in many pastoral and farming districts. It is generally supposed that timbered districts attract more cloud moisture than bare, treeless plains.

Writing of "Forests in Relation to Climate and Rainfall," Mr. W. Schlich, at one time Principal Professor of Forestry at the Royal Engineering College, Cooper's Hill, and late Inspector of Forestry to the Government of India, said:—

"The relation between forests and the climate and rainfall of India is of a very peculiar nature. On the one hand, a covering of forest vegetation reduces the

temperature of the air and soil, and increases the general humidity, and tends to increase the rainfall; while, on the other hand, the exceptionally high temperature which prevails in spring and early summer over the centre of the Indian peninsula brings about the summer monsoon rains, on which the welfare of India depends. In other words, extensive afforestation might increase the quantity of locally-formed clouds and produce local rainfalls, but it might also weaken the force of the south-west monsoon wind and, consequently, the accompanying rainfall.

"It is, perhaps, difficult to say what the ultimate effect of a general afforestation might be, but it may reasonably be assumed that the effects of forests, however extensive, are not likely to produce a quantity of rain which would make up for any weakening of the south-west monsoon. As a matter of fact, however, more than half the area of Madras, Bombay, the North-western Provinces, and Bengal is under cultivation, and a considerable additional area has been appropriated as grazing grounds, so that not more than one-fourth could remain under forest—an area which may be sufficient to moderate the temperature locally, but which is not likely to interfere with the advent of the south-west monsoon. The latter must be, for ever, the main source of moisture in India.

"Apart, however, from these theoretical speculations, *it has yet to be proved whether afforestation in low or level lands affects the rainfall at all.* [The italics are our own.—Editor.] The extensive observations made during late years in Europe have not yet led to any final conclusions, and those carried out in India have not extended over a sufficient number of years to permit of any conclusion at all. Several stations which show a specially large increase in rainfall are either situated far from the reserves, or in their vicinity little forest conservancy has been effected."

Again, with respect to floods, the roots of the trees on the hillsides bind the soil together, and, as a natural consequence, the rains sink gently into the ground, being intercepted by the roots and the undergrowth. When these are gone, the super-abundant water rushes, without hindrance, down the hillsides, carrying off, in its course, the best of the soil, and leaving in its wake great gullies which previously were only tracks. The mass of water has no time to permeate the soil, but makes its way straight to the creeks and rivers, which, swollen to an abnormal height, overtop their banks and submerge the surrounding low country, carrying ruin and desolation to many a before-smiling home, and involving the State, as well as private citizens, in enormous amounts to make good the loss. How often has this been the case in Queensland!

Now, the first subject of inquiry which suggests itself is: What are the causes which operate wastefully and injuriously upon our timber supplies?

In answer to this question, it will be found that the waste in a primeval Australian forest is apparently very great. In forests and scrubs, still untouched by the hand of man, vast quantities of large timber, including several varieties of hardwood, pine, cedar, and beech may be seen strewn over the ground. To the ordinary eye, this would appear a heavy loss, and so undoubtedly it would have proved, had there been a population a hundred years ago to utilise it. But these trees had long ago arrived at maturity and commenced to decay (a necessary process of Nature in the interests of the young timber), or else they have been attacked by termites and grubs, which perforate the wood, and thus render it useless for any other purpose than that of firewood. Much destruction may also be set down, not only to the ravages of white ants, but also to the effects of violent windstorms (as only lately exemplified by a cyclone in the Cairns district) and lightning. These causes, then, can hardly be taken into consideration as wasteful. For the latter result, we must turn to bush fires and the hand of man.

With regard to the first—*i.e.*, bush fires—their operation is scarcely so apparent in the comparatively densely-peopled Southern coast districts of this State as it is further to the northward and westward, where the population is sparse and over-stocking is avoided. In some portion of the latter part of Queensland, the grass, during the rainy season, grows to an incredible height, often so high as almost to conceal a horse. In addition to this, climbing plants and annual shrubs grow thickly amongst the dense herbage. When the rains are over, and the dry winter season has fully set in, bush fires of enormous extent occur, either owing to the carelessness of travellers, or to the wilful act of the aborigines, who fired the grass in past years for the greater convenience of hunting or travelling. Such fires are very destructive to the young timber, thousands of young saplings falling victims to the flames, or to the fall of the worn-out giants which sheltered their young growth. These bush fires are frequently followed by a dense growth of young black wattle scrub, and the super-abundant shade thus supplied has the effect of checking the germination of seeds which fall in thousands from the larger trees. The loss by bush fires does not apply to the dense scrubs (or jungles), which, owing to the moisture retained by the thick undergrowth, are practically fireproof.

We now come to the waste caused by the progress of settlement. This we find to be the most serious, and most requiring instant and earnest attention. In the early days of settlement in Queensland, when agriculture received little or no attention, the dense scrubs in the South, on the banks of the Brisbane and its tributary creeks; the Logan, Albert, Pimpama, Coomera, Nerang, Pine, Caboolture, Maroochy Rivers; and in the North, the Burnett, Mary, Barron, Johnstone, Bloomfield, and other rivers; many eastern rivers, besides scrub-clad mountain ranges: were rich in supplies of magnificent hoop and kauri pine, cedar, beech, silky oak, yellow-wood, maple, &c., &c., whilst on their edges, and in the forests, were quantities of stately eucalypts of many kinds.

In time, splitters and timber-getters got to work and "picked the eyes" out of the timber districts. Then commenced the losses and waste. It is well known to the initiated that many trees, fair to the eye, at a certain height from the ground, prove to have a "wind" further up. Other trees are so "interlocked" as to entail too much labour in the splitting. This "wind," twist, or "interlocking" renders that portion of the tree valueless to the splitter, whose business would not admit of his utilising it by cutting roads through the scrub to draw sound, but, to him, useless logs, to a river for transmission per punt to a sawmill. He, therefore, abandoned most, if not the whole, of a fine tree containing from 600 to 1,200 feet of sound timber, which, in the course of nature, decayed and was lost for ever, as far as saleable timber was concerned.

Often, a tree would hang suspended by the tough, rope-like vines overhead. (I am, of course, alluding to timber-getting in the scrubs.) The splitter found it simpler to fell another tree out of the abundance around him, than to lose time by cutting away the surrounding scrub, by which means alone could he secure the fall of the first. Again, trees were often lost by felling them on gusty days. The result was frequently what is technically known as a "kick-up"— that is to say, before the saw had fairly cut into the "shoulders," the wind seized the head of the tree, and, there being too much wood uncut by the saw, the tree split from the stump to a height of from 5 to 15 feet, then broke off short, when it either remained supported by the split stump, or fell to the ground, useless as a mill log. Floods again were a great cause of loss. Hundreds, if not thousands, of logs of both pine and cedar have been swept out to sea, the owners being powerless to save them. Some years ago numbers of fine pine and cedar logs might have been seen above high-water mark lying piled up on the beach between Southport and the Tweed Heads, carried out to sea from the rivers.

Fifty years ago there were large areas on the Brisbane River from what is now St. Lucia, away up to and beyond the Seventeen-mile Rocks, where hoop pine in the scrubs then standing, and hardwood on the forest lands adjacent to the river, offered a good living to the timber-getters and splitters. The writer was then engaged in the business (in 1863), and the following figures will show the amount of forest denudation which can be, and was effected by three men. The quantity of log timber they cut and despatched from the above area in one week alone amounted to 38,404 feet, or 47 logs. Gum and ironbark sold at 4s. per hundred to the Kangaroo Point sawmills. This does not include a quantity of pine logs which were rafted down the river. Large quantities of shingles, both pine and hardwood, were also obtained in this district, and here the waste was very great. Many trees were felled which proved unsuitable for shingles, and thus splendid sawmill material—the trees ranging from 600 feet to 2,000 cubic content—was left to go to waste where the trees fell.

Droughts have operated equally disastrously. Men have worked for two or three years, with expensive appliances in cedar scrubs. Vast quantities of splendid logs have been hauled to dry creeks communicating with navigable rivers, in the expectation that the periodical floods would carry them to the spot where a raft could be formed, but the floods have, on occasions, not been heavy enough to perform this work, and the result has been that the logs were left to rot on the creek banks.

But even all this destruction has been as nothing compared with that caused by agricultural settlement, and by indiscriminate licensing in "the good old days."

I will do most farmers the justice to say that they preserved as much of the heavy pine they found in the scrub land they had purchased, but the exigencies of their avocation demanded the clearing, burning off, and stumping of their land. Hence myriads of young pine trees, beech, silky oak, and yellow-wood in the South, cedar, silky oak, maple, &c., in the North, were unavoidably destroyed. I have, myself, for farming purposes, been compelled to cut down trees which, had they been growing until now, would have been valuable food for the sawmill.

The losses accruing to the State, however, by agricultural settlement are partially recouped by the substitution of one commercial product for another, and although it may fairly be argued that an acre of maize is not an equivalent for an acre of pine or cedar in a marketable condition, still, as it would require from twenty to fifty years—according to soil and situation—to produce an acre of pine trees 2 feet in

diameter, it would not be for the benefit of the country that all farm produce should be imported, as that would mean sparse population and slow progress. A few timber-getters would very soon fell the couple of hundred pine trees on an acre of land, and, unless the laws on the subject were very stringent with regard to replanting, a sum of about £200 would represent the whole gain in the time mentioned to a few men, whereas the same area would support a family of agriculturists year after year if it were devoted to agricultural pursuits. In connection with ringbarking, it should be remarked that the operation has a decidedly good effect upon pasture lands by increasing the covering of grass and other herbage, and also by increasing the supply of water on a run.

Springs have been known to break out after the trees have been "ringed," where no spring was formerly suspected. If we consider that a well-grown gum or ironbark will absorb as much as a hogshead of water from the soil, if not more, in twenty four hours, it may be conceived that the ringing of 100 such trees on an acre must have a beneficial effect upon the subterranean water supply, whatever baleful influence it may exert on the pluvial supply.

With regard to the effect of forest destruction on rainfall, Mr. H. C. Russell, Government Astronomer of New South Wales said (in 1898)—"The destruction of forests in New South Wales from the time that ringbarking was introduced, and for some fifteen or twenty years afterwards, would seem to have been more rapid than the destruction of any other forest in the world, and during that period, the rainfall gradually increased. There is clear proof that the rainfall in this part of the world did not get less as the trees disappeared; and in other countries, where the question has been fully investigated, it has been found that the rain comes, whether there be trees or not."

In a late issue of the "Brisbane Courier," some very pertinent comments on the subject of timber conservation by the Minister for Lands were published, and are well worthy of consideration. The writer of the article stated "that it was more profitable to grow butter and maize than timber, and that, in any case, iron and concrete were making timber unnecessary." On this, Mr. Coyne remarked that these were both the stock arguments of those who wanted to traffic in timber land, and the fallacies of many well-meaning old-timers, before they looked under the surface of things. As a matter of fact, he said, the new industrial uses of wood enormously outnumber the lost uses, and in consequence the demand for timber had increased by leaps and bounds, while the old-timers had been trying to wipe it off the earth. It was quite certain, for instance, that the United Kingdom would import as little wood as possible, and if the theory of substitution were correct, then the use of wood would be declining. The truth was, that the contrary had occurred. The consumption of timber in the United Kingdom, per head of population, was now three times what it was sixty years ago, and mounting costs of coal and labour would so increase the prices of possible wood substitutes that wood must continue in greater demand than ever. During the present war, for instance, prices of general commodities in United States of America increased by 200 per cent. to 300 per cent., but timber advanced only to 150 per cent. of its pre-war value. Timber still remained, and will remain, an elemental necessity of the human race, "from the cradle to the coffin," and no Government could be so wantonly blind as to lean on the broken reed of so utterly discredited a fallacy. Nor could any responsible Government succumb to the wiles of greater profit to such an extent as to convert its pinched timber patches into banana gardens. As a matter of fact, forestry was a safe 10 per cent. compound interest investment, and that was enough for anyone but the profiteer. Ninety-nine per cent. of the land of Queensland was available for ordinary settlement, and only the bare 1 per cent. was left for timber growing, and most of that consisted of rugged mountain range or barren sands, such as those of Stradbroke and Fraser Islands."

In our next issue we shall deal with the rate of growth of our various timbers, and show what was done in the past in conserving the natural forest trees of Fraser's Island, and in tree-planting on the island.

TO PREVENT IRISH BLIGHT IN POTATOES.

The *Agricultural Gazette*, England, recommends spraying potatoes with 1 per cent. solution of either Burgundy mixture or Bordeaux mixture, to prevent potato blight. The most successful treatment was found to be spraying with a 1 per cent. mixture before any disease appeared, then using a 1½ per cent. mixture in about a fortnight if the disease appears, followed by a 2 per cent. application if the disease becomes persistent. Many English farmers, however, use the 1 per cent. solution all through the season.

Entomology.

INSECT FRIENDS OF THE CANEGROWER.

By EDMUND JARVIS, Assistant State Entomologist.

While ploughing cane land one constantly unearths and exposes to view various forms of insect life, mostly representing different stages of the commoner species of Scarabæidæ, familiarly known as cane beetles.

Throughout summer, autumn, and late spring months the "white grubs" of these pests are mostly in evidence, while at other seasons living specimens of "greyback" beetles, and the chrysalis stage of this species, are often turned up from depths of 9 to 12 inches.

Although growers, of course, are perfectly aware that all the above-mentioned forms should be destroyed as far as possible, they understand little or nothing about the habits of other soil frequenting insects often occurring in the furrow, some of which, being parasitic on cane grubs, should be carefully protected.

On several occasions, whilst investigating in the field, information given by the writer has been much appreciated by those who had made a practice of indiscriminately destroying all larvæ whatsoever, in order, as they imagined, to be on the safe side.

It is hoped, therefore, that the following illustrated notes may serve a useful purpose by enabling growers to easily recognise the earlier life-cycle stages of certain useful insects associated with cane grubs.

NOTE.—All figures on the plate represent the natural size of fully-grown specimens. It should be borne in mind, however, that smaller examples of Figs. 1, 4, 7, 9 are often met with in the field, although as regards general appearance, these will resemble the illustrations given.

PARASITIC LARVÆ OF DIGGER WASPS.

Most growers have observed these plump, white, maggot-shaped larvæ, about an inch long, that are often found attached to dead or dying cane grubs. (Fig. 1.)

The life-history of this useful parasite may be briefly outlined as follows:—The female wasp, whilst flying close to the surface of the ground, detects the presence of a suitable grub in the soil below, and having located the exact spot, tunnels at once into the earth to a depth of 6 inches or more until reaching its prey.

A combat ensues, and having by a few judicious stings paralysed the grub and rendered it flaccid and helpless, it glues an egg to its body and returns to the surface to seek additional victims.

Three days later, a tiny maggot breaks the eggshell, and biting a hole through the skin of the host, inserts its head and starts feeding on the juices.

So voracious is its appetite, that in about a week little remains but the empty body, the substance and life of which has been gradually sucked away.

The sleek, well-fed maggot being now fully grown, spins an elongated oval cocoon (Fig. 2) of a dusky reddish-brown colour, inside which it transforms to the pupa or chrysalis stage.

These cocoons are formed of closely woven silk, hardened by the addition of some fluid to the stiffness of ordinary writing paper.

The digger wasp, which emerges about five weeks later—thus completing the life-cycle of about fifty days from egg to perfect insect—leaves the empty cocoon, and tunnelling to the surface, flies off to start grub-hunting on its own account.

Our two common digger wasps, named by scientists *Campsomeris tasmaniensis*, Sauss., and *C. radula*, Fab. are known to attack the larvæ of six species of cane beetles; the two favourite hosts, however, being the destructive "greyback" cockchafer (*Lepidiota albohirta*, Water.), and a smaller, very plentiful reddish-brown beetle (*L. frenchi*, Blackb.).

Space forbids detailed description of these wasps, but the size and form of a typical species is shown by Fig. 3.

With regard to general coloration, the body is black, banded behind with bright orange-yellow, while the wings are smoky brown.

PARASITIC LARVÆ OF "ROBBER FLIES."

By referring to Fig. 4, it will be seen that these larvæ, although maggot-shaped, differ from those of digger wasps in being longer, sub-cylindrical, and more slender; and in having the head end provided with a small, blackish beak consisting of two-pointed mandibles.

Living specimens, moreover, instead of appearing translucent and silky-whitish as in *Campsomeris*, are opaque, dull creamy-yellow, and when handled are far more active, being likely, in fact, to prick one with their mandibles whilst attempting to bore downwards.

Unlike the preceding parasite, these larvæ live freely in the soil for months, travelling about if needs be, and when encountering grubs, piercing them and subsisting on the internal juices.

Specimens are occasionally ploughed up while in the act of feeding, the head end at such times being generally buried deeply in the body of the victim.

The egg and early larval habits have not yet been investigated, but the mature larva and the pupa or chrysalis (Figs. 4, 5) both occur freely in cane furrows.

The latter stage, which is dark reddish-brown in colour, may at once be recognised by its curious armature of spines. (Fig. 5.)

The stout, hairy flies that emerge from these pupæ are of predatory habit, fearlessly pouncing upon unoffending insects often larger than themselves. Once clutched by the strong spiny legs, the prey has little chance of escape, and is soon sucked dry by the beaklike mouth of its captor.

Our largest and commonest "robber-fly" (Fig. 6), bred from larvæ found in canefields, is of a general dark brownish-black colour, the body being mostly clothed with white hairs and the legs dusky-red.

PREDACEOUS LARVA OF ELATERID BEETLE.

The species in question is closely related to the well-known "wireworm," which in some districts injures young plant cane.

Growers will have no difficulty in recognising this exceedingly useful larva, a full-grown specimen of which is shown in Fig. 7.

Its smooth, somewhat shining body is pale golden-yellow, shaded into reddish-brown at either extremity.

The head is almost black, and furnished with formidable curved jaws, while the plate-like upper surface of its anal or tail segment terminates in two pointed projections and is edged with stout black teeth.

This larva grows very slowly, living underground for two years or more before transforming to a beetle.

It can travel with great ease through the soil, and in the course of so long an existence, doubtless destroys numerous cane grubs.

The specimen that furnished the illustration was collected in November, 1914, and during a captivity of seven months killed and devoured no less than 126 large grubs and four "greyback" beetles.

These, however, represented only a portion of the total number of its victims, as, when first obtained, this larva was 2¾ inches in length, so had probably been thinning the ranks of the enemy for at least twelve months prior to capture.

Needless to say, these valuable, eminently predaceous larvæ should be most carefully preserved.

It would, indeed, be worth while when noticing specimens in the furrow to stop the plough and cover them with soil to prevent birds from eating them.

The pupal and beetle forms of this insect do not come under the notice of growers, since the former stage occurs at depths below ordinary ploughing, while the perfect insect, which is probably of nocturnal habits, is seldom met with.

It may be of interest to state, however, that this elaterid or "skip-jack" beetle (*Agrypnus mastersi*, Pasc.) is of a uniform polished chestnut-brown colour, and measures about 1½ inches in length.

E. JARVIS, DEL.

PLATE 29.—INSECT FRIENDS OF THE CANEGROWER.

1. Larva of the Digger Wasp.
2. Cocoon of female of same.
3. Digger Wasp (*Campsomeris radula* Fab.)
4. Larva of Robber Fly.
5. Pupa of same.
6. Robber Fly (*Asilus, sp.*)
7. Larva of Elaterid Beetle.
8. Pupa of Dexiid Fly.
9. Cane-grub covered with Green Muscardine Fungus.

(*All drawings original.*)

PUPÆ OF PARASITIC DEXIID FLIES.

These dipterous pupæ, which occur loosely in the soil, are not uncommon in canefields, but being dark and of inconspicuous form, are more noticeable when ploughed up on light-coloured lands.

The maggot lives inside a cane grub until fully grown, and then, crawling just outside the dead body, changes into a reddish-black egg-shaped pupa, not unlike that of a common blowfly, but much larger and plumper in proportion.

It will be seen from Fig. 8 that this pupa differs from a digger wasp cocoon in being smaller, and in having a smooth, hard, somewhat shelly exterior.

Although several species of these parasitic flies, belonging to the family *Dexiida*, have been bred by entomologists at different times from various Scarabæid larvæ, little or nothing appears to have been recorded respecting their early life-cycle stages.

At first sight, the perfect insects might readily be mistaken for gigantic blowflies, but are generally of brighter appearance and are very often adorned with splendid metallic colours.

THE GREEN MUSCARDINE FUNGUS. (*Metarrhizium anisopliæ Metsch., Sor.*)

Most growers are familiar with the appearance of grubs killed by this vegetable parasite, as the body instead of decomposing retains its shape, and gradually hardening, turns at first white and finally an olive-green colour. (Fig. 9.)

The internal organs and fluids of the host are quickly absorbed and replaced by vegetable tissue constituting the rooting portion or mycelium of the fungus, until the entire larva ultimately becomes as firm as a piece of cheese and can be broken into pieces.

The green crust-like covering noticed on affected grubs is in reality the fructification or seeding portion of the fungus, composed of millions of spores, each of which, however, under certain atmospheric conditions, is supposedly able to produce the disease if chancing to find a suitable spot for its development.

The number of spores of *Metarrhizium* fungus occurring on a single insect about one-sixth the size of our common cane grub has been counted by scientists and found to reach the enormous total of 66,400,000.

Specimens attacked by this disease are met with, chiefly during the cooler months, and should always be left in the field and covered over with a few inches of soil.

CANE GRUB INVESTIGATION.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report upon Cane Grub Investigation, from the Entomologist, Dr. J. F. Illingworth:—

The continued drought is becoming serious for young cane, though fields which have had frequent cultivation are still in fair condition. Much of the land prepared for late planting will have to stand over, for the season is now too far advanced, even if rains came—except for quick-growing varieties, like H 7 426 ? (Clark's Seedling).

I hoped to be able to give the results of harvesting the Meringa plots in this report, but the work is not half done yet, owing to the unsettled condition of labour. I may say, however, that this cane is cutting out very much better than estimated, and the percentage of ccs. is exceptionally good. These results are particularly satisfying, considering that the crop on this land has failed completely in former years—the grubs eating it right out of the ground. Furthermore, with severe drought, such as we have experienced during the past season, it is very difficult to grow a crop on these red volcanic soils. Undoubtedly, our thorough cultivation was one of the most important factors in the control of the grubs. The plots treated with arsenic, however, show remarkable results, which will be more evident when I am able to give the weights of the crops from the various plots.

SUGAR-CANE BEETLE BORER.

This pest is becoming increasingly abundant in certain localities, and its control demands immediate attention. After the cyclone in 1918 there was an abundance of damaged cane, much of which was left on the ground, offering an ideal breeding-place for the multiplication of these beetles. Since that time, we have had frequent calls for assistance from the Babinda and Innisfail districts. While I hope, eventually, to get the Tachinid parasitic flies established in these districts, I must urge immediate concerted action among the farmers of infested areas.

This action should consist of two procedures: (1) thorough burning of all trash throughout the infested area; and (2) planting clean seed. If the trash is burned from the standing cane there is less opportunity for the beetles to escape by flying to nearby fields. Here is an opportunity for associations in infested districts to take a hand, and insist upon a general clean-up; for it is almost useless for an individual, working alone, if his neighbours maintain infested fields.

Let me again call attention to the matter of clean seed. In any case, it is rather dangerous to select plants from an infested field, for it is almost impossible to prevent putting in some of the early stages of the pest—eggs, imbedded in the rind, would certainly be overlooked, and they would hatch just as well after planting. Then, too, if the bags of plants are left in the infested field overnight, they are very attractive to the beetles, which deposit their eggs on the cut surfaces. In one instance, I examined several bags of plants, which had lain on the ground in the field for some time, and found them a writhing mass of borer grubs and frass. I was told that these plants showed no signs of borers when they were placed in the bags. If the use of plants from an infested field is unavoidable, they should at least be removed as soon as cut, so that no beetles have an opportunity to further infest them.

A systematic clean-up throughout the district, leaving no souring cane to assist the beetles in holding over, would do much to eradicate the pest. Then, by using clean seed, the plant-crop, at least, should be fairly free.

PARASITES FOR WHITE GRUBS.

Mr. Frederick Muir, Entomologist of the Hawaiian Sugar Planters' Association, during his recent stay at our station supplied me with considerable information upon this important phase of the problem. As is well known, Mr. Muir has spent many years in extensive travel, collecting and breeding parasites of insect pests of sugar-cane. Consequently, I was gratified to have his cordial interest and advice. He called my attention to the numerous parasites of white grubs in Java, where this pest consists of many species of beetles. I was especially interested to learn that beetles of the genus *Lepidiota*, the same as our cane grubs, are found there; and that they are fairly well controlled by natural enemies. Furthermore, Mr. Muir mentioned two species of bacteria which are apparently very effective there at times.

Since the climate of Java is very similar to our own—the rains coming in the summer time—it would only be natural to conclude that these friendly organisms might be of excellent service if introduced here. Transportation, in this case, would not be difficult, since there is a rather direct line of boats. At any rate, it behoves us to utilise every possible assistance in this tremendous problem. Delay means a loss of many thousands of pounds annually to the industry. Therefore, I would urge the immediate introduction of as many natural enemies as we can secure.

On his return from Bundaberg the General Superintendent of Sugar Experiment Stations stated that the recent rains in that district, while not nearly sufficient, have relieved the country, to a large extent, of its drought-smitten appearance. The young grass was spreading its green carpet in every direction, and the rain has been most beneficial to the young plant cane and that just starting to ratoon. The falls have been somewhat irregular, but nearly every portion of the district has benefited more or less and good rains have also fallen in the Childers district. The rain has greatly cheered the cane farmers, and as the thunderstorm season has now apparently set in, conditions seem promising for further falls. The work at the Experiment Station is in full swing and a large area of cane has been planted, principally new varieties to be tested chemically and in the field. Some very interesting experiments are to be carried out during the coming year, further particulars of which will be found in the forthcoming annual report of the Sugar Experiment Stations. With regard to this year's crushing at Bundaberg, it may be said that it has been a very disappointing one. Qunaba and Gin Gin did not crush at all, and Fairymead, Bingera, and Millaquin had only small crops to deal with. The two former mills have finished crushing and Millaquin anticipates finishing in about a fortnight. Given a good season, it is expected there will be a fair crushing next year, but, owing to drought and scarcity of plants, the area planted is not so large as usual, and what planting will be carried out, now that rain has fallen, will probably not produce enough cane to be cut till 1921.

Botany.

RECORDS OF POISONING OF BIRDS BY TWO SPECIES OF CASSIA.

By C. T. WHITE, Government Botanist.

CASSIA BICAPSULARIS, *L.*

This tropical American shrub is not uncommonly grown in Queensland gardens as an ornamental species and is conspicuous on account of the rather large masses of bright yellow flowers it bears. Some short time ago, Mr. M. J. Colclough brought me specimens for identification, with the record that it was responsible for the deaths of a number of finches in his aviary. Several species of cassia have been accused of poisoning stock in Australia, though—as in the case of the majority of our suspected plants—nothing very definite could be proved against them (and botanists had always great doubt on the poisonous properties of these plants, looking on them as merely possessing purgative properties, like many others of the genus, including the sennas of commerce.

CASSIA SOPHERA, *L.* VAR SCHINIFOLIA, *BENTH.*

This is a native cassia that goes under various local names, such as "yellow pea," "wild senna," and "arsenic bush," the last name denoting that it has previously been suspected of possessing poisonous properties. It has a wide distribution in Queensland and also occurs in New South Wales and in the Northern Territory. J. H. Maiden (*Agricultural Gazette,* N.S.W., Vol. 6, page 241) has recorded it as a bad weed in New South Wales, stating that many people in that State regard it as poisonous to stock, but he also quotes a correspondent as saying: "Sheep will eat the dry seed-pods and seeds, while poultry eat the seeds." So it would seem that any poisonous principle existing in the plant would reside solely in the green shoots.

Recently, when in the Goondiwindi district, the local stock inspector, Mr. P. J. Short, told me that a number of his fowls and a turkey hen had died as the result of picking at the green shoots of this plant, the only green thing in his poultry run.

In the cases here quoted, there seems no doubt that the species of cassia referred to could definitely be blamed as the cause of the deaths of the birds in each; and it would further seem that the fairly numerous charges of stock poisoning made against various species of cassia in Queensland may be more correct than previously imagined. This, however, is a matter that can only be ascertained by future investigations.

HERBGROWING.

We have frequently advised our agricultural readers to take up herbgrowing, even on a small scale. Why should we import practically all the culinary and medicinal herbs, for which there is a large demand? "The Producers' Review" (10th November) writes:—"Practically all the herbs used in cookery in Australia are imported. In their dried form they are worth 1s. 6d. per lb., or £168 per ton. This is quite sufficient evidence that herbgrowing in Australia should be a remunerative occupation." There is no need for a large farm. Three or four acres, including space for a dwelling-house, barn, stable, &c., would be ample for the business. Growers in the Cleveland district are said to be well satisfied with the returns from their herb crops, for which there is a ready market in Queensland.

LONDON QUOTATIONS.

Cotton, 23.49d. per lb; rubber (Para), 30d. per lb.; linseed oil, 92s. per cwt.; cotton seed oil, £55 per ton; coconut oil, £59 per ton; Mexican sisal hemp, £60 per ton; Mauritius hemp, £55 per ton; Manila hemp, £51 per ton.

General Notes.

THE NATIONAL ASSOCIATION.

The proposal of some stock-breeders to change the month of the National Exhibition from August to May has its pros and cons. Both dates have been criticised, and Mr. J. Bain, Secretary of the Association, has replied to the advocates of the month of May as follows:—

"In connection with the above matter, it is illuminating to note that the date of holding the Melbourne Show is parallel in seasonal conditions with our own, August in Brisbane and September in Melbourne, being practically the beginning of Spring.

"Under these circumstances, and in view of the knowledge that an agitation was in progress for changing the Brisbane Show dates, it was very interesting to hear during my recent visit to Melbourne the expressions of opinion from Victorian exhibitors. Cattle breeders admitted that May would suit the selling exhibitor better than September, but it had to be borne in mind that there were a great many more buyers than sellers.

"Buyers were emphatically in favour of a September show.

"'It has to be remembered,' said one exhibitor, 'that a show is not composed of cattle only. As a sheep man, I am opposed to any change of date.' Horse exhibitors to whom we spoke were equally opposed to a change from September.

"I feel that it would be a very unwise action on the part of the National Association to make any change at present. We have no knowledge that the majority of breeders are in favour of the change, rather is the argument the other way, for a very large number of breeders have been circularised in this matter asking for expressions of opinion, but notwithstanding this very extensive correspondence, according to the list which you give, only twenty-four have replied in favour of May, and analysis of the names show that ten of the twenty-four are not exhibitors at our Show, and six are not even members.

"It would appear from this that the majority of the 219 cattle exhibitors at our last Show are so utterly indifferent that they have not taken the trouble to reply.

"Until overwhelming arguments in favour of a change can be submitted, this Association would be ill-advised to make any change.

"In conclusion, I might mention that one of the most prominent cattle-breeders in Queensland ridicules the change, asserting that the Brisbane Show has got beyond the days of grass-fed stock, whilst another, possibly one of the biggest sheep-breeders we have in the State, writes:—

"'From a cattle point of view alone the change would have certain advantages, but I view it that such an Association as yours has to view the matter generally . . . . It would have too big an effect upon the Brisbane ram sales, which are coming more to the fore. These sales would not be a success if held at any other time than the Show week.'"

PEANUT OIL AND FLOUR.

Beside the great value of the peanut as an oil-producer, the residue after extraction of the oil takes the form of a cake of a definite standard of purity, enabling the flour to be used as a nourishing and palatable food for human beings. On this subject, "Tropical Life" (Ceylon), for September, 1919, has an article from the *Agricultural News*, Vol. xviii., No. 444, on "Nutamine," as this ground-nut cake has been designated, and in which the methods employed in preparing this article are described as follows:—

"In order to 'pick over' the nuts more satisfactorily and effectively, it is suggested that they be cleaned on a mechanical washer, and then thoroughly dried in a mechanical drier. After this, the inner red skin is removed by means of a blast of hot air playing on the seeds while they are being whirled round in a large drum. In this way the seeds are dried, cracked, and the red skin blown away. By this method the preliminary drying of the seeds is avoided, and the cleaned seeds are left practically free of their red skin, and ready for oil expressing. To obtain good,

clear oil and good cake, hydraulic presses are used, and the expression should always be carried out cold, as the resulting cold-drawn oil is nearly colourless, has a pleasant taste and odour, and can be used as a substitute for olive oil. Such oil also keeps remarkably well.

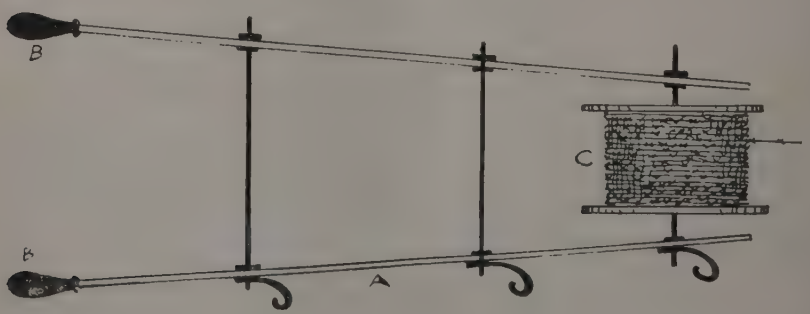
"The resulting cake, however, still contains between 10 to 15 per cent. of oil, and this is too much for the production of 'nutamine.' The cake must be subjected to a second expression, being warmed this time. The resulting oil, of an inferior grade, is widely used in soapmaking, and the cake left after this second pressure should contain about 5 per cent. of oil, the standard aimed at. This cake, when finely ground in an ordinary roller mill, and subsequently passed through a sieve, is the preparation known as 'nutamine.'

"From this fine flour thus obtained, biscuits and many other articles for human consumption can be made, for if the oil has been properly removed, the flour has quite a pleasant taste, and possesses a high protein content. Being deficient in carbohydrates, the flour should be ordinarily mixed with a proportion of wheat flour, and this gives a highly nutritious mixture, and supplies a concentrated and economical food. Bread and biscuits made from the following recipe are said to keep well, and to possess a pleasant taste, the dried milk adding to the food value. Groundnut flour, 84 parts; dried milk, 14 parts; sodium bicarbonate, 2 parts. Biscuits made from such a mixture are reported to be light, and to keep well in a tin. It would appear, however, that should anyone in these islands desire to make experiments with biscuits from groundnut flour, the quantity of fresh milk needed to moisten the flour could well take the place of the dried milk in the recipe given above.

"It is stated that whilst wheat, oats, and several other cereals are markedly deficient in the so-called basic aminoacids, groundnut cake and flour contain a large amount of these. Hence the reason for the designation 'nutamine.'"

RUNNING OUT BARBED WIRE.

Mr. W. Taylor, Mitchell, writing on this subject, as dealt with in the October issue of this journal, says that his method is handier. His plan is to get two side sticks 6 ft. long, and three cross sticks, 2 ft. long. Bore three 1-in. holes in each side stick, and point the cross sticks to fit the holes. Drive them in and fasten, leaving one side loose to put the coil of wire on. Use three wire pins to hold it loosely. Put on the coil of wire and start away. The side sticks prevent the coil falling off. This constitutes, in fact, a skeleton wheelbarrow.



Answers to Correspondents.

CANARY BREEDING.

A beginner in breeding canaries asks for information concerning the pairing of the birds, and the length of time elapsing before the eggs are hatched.

A writer on this subject says:—I breed canaries and will tell you how to do it:—

In June and July start getting your cages, nests, &c., all ready, leaving nothing till the last minute; and the last week in July, or the first week in August, put the birds together. Some very successful breeders pair their birds at the end of June, or beginning of July. The hen generally lays the first egg eight or nine days after being paired. It is best to take the first two eggs away the morning they are laid, and return them the morning the third egg is laid. By taking the eggs away the young are all hatched about the same time, and get much better fed. Always use a spoon in removing the eggs, as the fingers might break them. The eggs should be hatched thirteen days after you have returned them. Always keep a bit of cuttlefish hung up in the cage—it keeps the hen from being egg-bound. Leave the young birds with the old ones as long as you possibly can. When they annoy or worry the hen, or the old bird starts plucking them, put them in the division specially made for that purpose in the cage, or else put them in a weaning cage hung on the front of the breeding cage, and the old birds will feed them through the bars. It is not desirable to let the hens have more than three nests in a season. If you do, the following season the hens that have more than three nests will have very weak young birds. During breeding time, give both the old and young birds egg, mixed with Eastway's Canary Food. The best way to mix it is as follows:—Boil the egg for 12 minutes, and then take the yolk only and mix it (using the back of a fork) with three tablespoonfuls of Eastway's Canary Food. This would be enough for six birds for one day. Give your birds plenty of green food—watercress is best. It is a pleasure for the hen to feed her young when she can get watercress. Give the birds plenty of fresh water to bathe in during breeding time.

A MILK TEST.

W. Cox, Hawthorne—

In the sample of milk forwarded by you to this office, a good deal of butter-fat had risen to the surface during transit, and Mr. Graham, Chief Dairy Expert, said that it was impossible, consequently, to carry out a reliable test. For your information, he states that the following test is recognised by many as being very reliable:—

Immediately after the milk has settled down after being drawn from the cow, take a glass of clean rain water, and when the water is perfectly still in the glass, insert a clean knitting needle into the milk. Upon withdrawing same a drop or more of milk will be found adhering to the needle. Allow one drop of milk from the needle to fall steadily into the water in the glass. In cases where the cow is in calf, the bead of milk will be carried almost, if not quite, to the bottom of the glass before it loses its spherical shape, and becomes diffused amongst the water. In cases where the animal is not in calf the drop of milk will become diffused with the water as soon as the two fluids meet.

Naturally, there are many factors which may interfere with the reliableness of a test of this nature, but, in the majority of cases, the test can be taken as a fairly accurate guide.

FEEDING PIGS.

A correspondent asks how it would do to let pigs run in a paddock under Rhodes grass, and feed maize to them in addition.

For the purpose of raising pigs, this method of feeding may be tolerably successful, but when applied to the fattening of the animals the result would scarcely be satisfactory, unless a comparatively large proportion of maize is fed,

the reason being that the pig is not capable of the digesting of anything like the complement of Rhodes grass which is necessary in order to supply the amount of nutriments requisite for the pig while fattening. For utilisation in connection with the fattening of pigs for market, Rhodes grass is not the equal of lucerne as mentioned. Further, the palatibility of Rhodes grass has to be considered, as it is doubtful whether swine will partake extensively of Rhodes grass, especially when a liberal supply of maize is fed in conjunction with it. In such cases it is probable that the pigs will eat comparatively less of the Rhodes grass and rely more fully upon the available maize for their sustenance; and, in the event of this happening, the suggestion to utilise Rhodes grass to a fairly full degree in the fattening of pigs would be defeated.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF OCTOBER, 1919, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING OCTOBER, 1919 AND 1918, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Oct.	No. of Years' Records.	Oct., 1919.	Oct., 1918.
North Coast.	In.		In.	In.
Atherton	0·90	18	0·43	0·25
Cairns	2·03	37	0·18	0·15
Cardwell	1·97	47	0·06	0·14
Cooktown	1·15	43	0·15	Nil
Herberton	0·92	32	0·06	0·20
Ingham	1·54	27	Nil	1·24
Innisfail	3·05	38	0·22	0·96
Mossman	3·46	11	0·14	0·34
Townsville ...	1·21	48	Nil	Nil
Central Coast.				
Ayr	0·90	32	0·01	0·02
Bowen	1·05	48	Nil	Nil
Charters Towers ...	0·67	37	Nil	0·06
Mackay	1·89	48	0·06	Nil
Proserpine	1·80	16	0·12	0·52
St. Lawrence ...	1·87	48	0·42	0·15
South Coast.				
Biggenden	2·24	20	0·65	0·03
Bundaberg	2·14	36	2·28	0·04
Brisbane	2·65	68	0·86	1·14
Childers	2·14	24	4·71	0·10
Crohamhurst ...	3·57	25	0·71	0·80
Esk	2·41	32	1·15	0·92
Gayndah	2·41	48	1·42	0·36
Gympie	2·73	49	2·16	0·99
Glasshouse M'tains	2·87	11	0·71	0·33
Kilkivan	2·69	40	1·34	0·21
Maryborough ...	2·74	48	2·92	0·55

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Oct.	No. of Years' Records.	Oct., 1919.	Oct., 1918.
South Coast—continued:	In.		In.	In.
Nambour	3·14	23	0·51	0·42
Nanango	2·38	37	0·73	1·02
Rockhampton ...	1·80	32	1·58	0·01
Woodford	2·68	32	1·06	1·00
Darling Downs.				
Dalby	2·14	49	0·87	1·51
Emu Vale	2·40	23	0·54	1·06
Jimbour	1·91	31	0·36	1·59
Miles	2·02	34	0·17	0·88
Stanthorpe ...	2·65	46	0·69	1·24
Toowoomba ...	2·71	47	0·50	1·78
Warwick	2·30	32	0·38	0·87
Maranoa.				
Roma	1·74	45	0·09	1·11
State Farms, &c.				
Bungeworgoral ...	1·22	5	0·06	0·84
Gatton College ...	2·33	20	0·66	0·68
Gindie			Nil	0·04
Hermitage ...	1·99	13	0·51	0·98
Kairi	1·24	5	Nil	0·67
Sugar Experiment Station, Mackay	1·77	22	0·01	Nil
Warren	2·34	5	2·48	Nil

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for October this year, and for the same period of 1918, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, State Meteorologist.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR NOVEMBER, 1919.

Article.		NOVEMBER. Prices.
Bacon	lb.	11½d.
Barley	bush.	5s. 3d. to 5s. 6d.
Bran	ton	£9 15s.
Broom Millet	"	£45
Broom Millet (Sydney)	"	£60 to £70
Butter (First Grade)	cwt.	188s. 4d.
Chaff, Canary Straw	ton	...
Chaff, Lucerne	"	£13 10s. to £22 5s.
Chaff, Mixed	"	£15 5s.
Chaff, Oaten	"	£14 to £15 6s.
Chaff, Wheaten	"	£12 to £15
Cheese	lb.	11d.
Flour	ton	£14 10s.
Hams	lb.	1s. 10d.
Hay, Lucerne	ton	£8
Hay, Oaten	"	£15 10s.
Hay, Wheaten	"	...
Honey	lb.	5½d. to 7d.
Maize	bush.	8s. 1d. to 8s. 9½d.
Oats	"	6s. 2d.
Onions	ton	£19 to £20
Peanuts	lb.	6d. to 9d.
Pollard	ton	£10 5s.
Potatoes	"	£34 5s. to £40
Potatoes (Sweet), per sugar-bag	...	5s. 6d. to 8s. 6d.
Pumpkins (Cattle)	ton	£8 to £11 10s.
Sugar-cane	"	...
Turnips (Swede)	cwt.	11s. 6d.
Eggs	doz.	1s. 2d. to 1s. 5d.
Fowls	per pair	5s. 5d. to 10s. 6d.
Ducks, English	"	5s. to 6s. 6d.
Ducks, Muscovy	"	8s. to 11s.
Geese	"	9s. to 12s.
Sucking Pigs, per pair	"	19s. to 22s. 6d.
Turkeys (Hens)	"	10s. to 17s.
Turkeys (Gobblers)	"	40s. to 49s.

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per dozen bundles	6s. to 15s. 6d.
Beans, per sugar-bag	8s. to 15s.
Beetroot, per dozen bunches	1s. to 1s. 6d.
Cabbages, per dozen	4s. 6d. to 25s.
Carrots, per dozen bunches	9d. to 1s.
Cauliflowers, per dozen	...
Celery, per bundle	2s. 6d. to 2s. 9d.
Cucumbers, per dozen	6d. to 2s. 6d.
Lettuce, per dozen	6d. to 1s.
Marrows, per dozen	3s. to 11s.
Peas, per sugar-bag	10s. to 14s.
Potatoes (Sweet), per sugar-bag	5s. 6d. to 10s.
Pumpkins (table), per sack	10s. to 12s.
Tomatoes, per quarter-case	8s. to 15s.
Turnips, per doz. bunches	3s. to 4s.
Turnips (Swede), per sugar-bag	11s. 6d.

SOUTHERN FRUIT MARKETS.

Article.	NOVEMBER. Prices.
Bananas (Queensland), per case	22s. to 30s.
Bananas (Tweed River), per case	24s. to 31s.
Bananas (Fiji), per case	...
Cherries, per half-case	12s. to 16s.
Lemons, per bushel-case	14s. to 17s.
Mandarins, per case	12s. to 22s.
Oranges, per bushel-case	15s. to 16s.
Oranges (Navel), per bushel-case	22s to 25s.
Passion Fruit, per double-case	22s.
Pineapples (Queens), per double-case	18s. to 20s.
Pineapples (Ripleys), per double-case	12s. to 20s.
Pineapples (Common), per double-case	10s. to 15s.
Strawberries (Queensland), per tray	...

PRICES OF FRUIT—TURBOT STREET MARKETS.

Apples, Eating, per bushel-case	15s. to 23s.
Apples, Cooking, per bushel-case	16s. to 17s.
Apricots, per half-case	12s. 6d. to 15s.
Bananas (Cavendish), per dozen	2d. to 10½d.
Bananas (Sugar), per dozen	3½d. to 8d.
Cape Gooseberries, per quart	10d. to 11½d.
Cherries, per tray	10s. to 12s. 6d.
Citrons, per cwt.	9s. to 14s.
Cocoanuts, per sack	15s. to 25s.
Custard Apples, per quarter-case	...
Lemons (Lisbon), per half-case	11s. to 22s.
Lemons (Rough), per cwt.	14s.
Mandarins, per case	...
Mangoes, per case	4s. to 8s. 6d.
Oranges (Seville), per cwt.	17s.
Oranges (Navel), per case	14s. to 18s.
Oranges (Other), per case	8s. to 25s.
Papaw Apples, per quarter-case	2s. 5d. to 3s. 6d.
Passion Fruit, per half-bushel case	11s. to 15s.
Pineapples (Rough—green to ripe), per case	4s. to 9s. to 16s.
Pineapples (Smooth), per case	10s. to 15s.
Pineapples (Ripley), per dozen	8s. to 16s.
Strawberries, per dozen boxes	8s. to 20s.
Tomatoes (prime), per quarter-case	10s. to 14s.
Tomatoes (inferior), per quarter-case	3s. to 7s.

TOP PRICES, ENOGGERA YARDS, OCTOBER, 1919.

Animal.	OCTOBER. Prices.
Bullocks	£29 to £30
Cows	£18 15s. to £20 2s. 6d.
Merino Wethers	44s.
Crossbred Wethers	44s.
Merino Ewes	27s. 3d.
Crossbred Ewes	45s.
Lambs	41s.
Pigs (Bacon)	£5 11s.
Pigs (Porkers)	£2 10s.

Farm and Garden Notes for January.

FIELD.—The main business of the field during this month will be ploughing and preparing the land for the potato and other future crops, and keeping all growing crops clean. Great care must be exercised in the selection of seed potatoes to ensure their not being affected by the Irish blight. Never allow weeds to seed. This may be unavoidable in the event of long-continued heavy rains, but every effort should be made to prevent the weeds coming to maturity. A little maize may still be sown for a late crop. Sow sorghum, imphee, Cape barley, vetches, panicum, teosinte, rye, and cowpeas. In some very early localities potatoes may be sown, but there is considerable risk in sowing during this month, and it may be looked upon merely as an experiment. Plant potatoes whole. Early-sown cotton will be in bloom.

KITCHEN GARDEN.—A first sowing of cabbages, cauliflower, and Brussels sprouts may now be made in a covered seed bed, which must be well watered and carefully protected from insect pests. Sow in narrow shallow drills; they will thus grow more sturdy, and will be easier to transplant than if they were sown broadcast. The main points to be attended to in this early sowing are shading and watering. Give the beds a good soaking every evening. Mulching and a slight dressing of salt will be found of great benefit. Mulch may consist of stable litter, straw, grass, or dead leaves. Dig over all unoccupied land, and turn under all green refuse, as this forms a valuable manure. Turn over the heavy land, breaking the lumps roughly to improve the texture of the soil by exposure to the sun, wind, and rain. In favourable weather, sow French beans, cress, cauliflower, mustard, cabbage, celery, radish for autumn and winter use. Sow celery in shallow well-drained boxes or in small beds, which must be shaded till the plants are well up. Parsley may be sown in the same manner. Turnips, carrots, peas, and endive may also be sown, as well as a few cucumber and melon seeds for a late crop. The latter are, however, unlikely to succeed except in very favourable situations. Transplant any cabbages or cauliflowers which may be ready. We do not, however, advise such early planting of these vegetables, because the fly is most troublesome in February. For preference, we should defer sowing until March. Still, as "the early bird catches the worm," it is advisable to try and be first in the field with all vegetables, as prices then rule high. Cucumbers, melons, and marrows will be in full bearing, and all fruit as it ripens should be gathered, whether wanted or not, as the productiveness of the vines is decreased by the ripe fruit being left on them. Gather herbs for drying; also garlic, onions, and eschalots as the tops die down.

FLOWER GARDEN.—To make the flower-beds gay and attractive during the autumn and winter months is not a matter of great difficulty. Prepare a few shallow boxes. Make a compost, a great part of which should consist of rotten leaves. Fill the boxes with the compost; then sow thinly the seeds of annuals. Keep the surface of the soil moist, and when the young seedlings are large enough to handle lift them gently one by one with a knife or a zinc label—*never pull them up by hand,* as, by so doing, the tender rootlets are broken, and little soil will adhere to the roots. Prick them out into beds or boxes or very little soil containing plenty of leaf mould. Then keep a sharp lookout for slugs and caterpillars. Keep a supply of tobacco dust on hand, and scatter this in the path of the slug, and he will cease from troubling you.

All kinds of shrubbery plants may be propagated by cuttings. Thus, pelargoniums, crotons, coleus, and many kinds of tropical foliage plants can be obtained from cuttings made this month. After putting out cuttings in a propagating frame, shade them with a piece of calico stretched over it. Be careful not to over-water at this season. Propagate verbenas, not forgetting to include the large scarlet Fox-hunter. Verbenas require rich soil. Palms may be planted out this month. If the weather prove dry, shade all trees planted out. With seed boxes, mulch, shade, water, and kerosene spray, all of which imply a certain amount of morning and evening work, the flower garden in autumn and winter will present a charming sight, and will afford light and profitable work for girls with spare time on their hands.

An exhaustive booklet on "Flower Gardening for Amateurs" has been issued by the Department of Agriculture and Stock, and may be obtained from the Office. Price, 2s.

Another useful publication is "Market Gardening in Queensland." Price, 1s., also issued by the Department. The sixth edition being exhausted, the seventh and revised edition will shortly be ready for issue.

Orchard Notes for January.

THE SOUTHERN COAST DISTRICTS.

The fruit of the month in this part of the State is the grape, and its gathering and marketing will occupy the attention of growers. Care should be taken to cut the fruit when cool and dry, and if it has to be sent any distance the stems of the bunches should be allowed to wilt before the fruit is packed, as the berries will then hang on to the bunch better, and the bunch carry in better order. Select the fruit carefully, grade it, and pack firmly so that it will not bruise in transit. If to be sent long distances, pack in crates holding from four to six 6-lb. baskets. Pines will be ripening in quantity towards the end of the month. Gather before fully coloured, and, whether for Southern or local markets, pack and handle carefully to prevent bruising. Do not ship the fruit too green for the Southern markets, as doing so is apt to spoil the trade. Send good fruit to the canneries. Small pines and crippled fruit are no good to canners, and the sooner our growers realise that it only pays to grow good fruit the better for them and for the canners, for if the latter cannot get good fruit, it is impossible for them to put a line of goods on the market that will not only be a credit to the State, but for which a world-wide market can be obtained.

Passion fruit should not be allowed to lie about for days on the ground before gathering, as, if so, they are apt to become fly-infested.

Watermelons and rockmelons are still in season.

Watch any late peaches, Japanese plums, or other fruits liable to be infested with fruit-fly, and gather and destroy all infested fruit, or, better still, grub the trees out and burn them as they only breed flies to destroy more valuable fruit. Mangoes will be ripening during the month. See that all fly-infested fruits are destroyed, as they will only breed up further crops to destroy later ripening fruits.

Citrus orchards can be cyanided during the month for scale insects, and spraying for Maori with the sulphide of soda wash should be continued where necessary.

Mangoes can be budded during the month, as well as citrus and deciduous trees. Tropical fruit trees can be transplanted, taking care to choose dull weather and to cover same from the direct rays of the sun till they have become firmly established. Pines and bananas can still be planted.

THE TROPICAL COAST DISTRICTS.

Mangoes will be going off. See that they are not allowed to remain about on the ground to breed flies for the autumn crop of oranges. Longan, litchi, and other fruit are in season. As the month is often a very wet one, little cultivation can be done in the orchards. Strong undergrowth should, however, be kept down with a hoe or scythe. Tropical fruits of all sorts can be planted. Look out for Maori on citrus fruits, and spray when necessary.

THE SOUTHERN AND CENTRAL TABLELANDS.

January is a busy month in the Stanthorpe district, apples, pears, plums, peaches, and nectarines being in season. Do not gather the fruit too immature; at the same time, don't allow it to be over-ripe. Gather dry, handle carefully, grade and pack in attractive cases. Keep the fruit as cool as possible, and ship in well-ventilated cars. Keep a sharp lookout for fruit-fly, and take every possible means to prevent its spreading, even going as far as to gather and destroy the whole of the fruit on any infected trees, for if kept in check during the month, the bulk of the fruit ripening during February will be free.

Keep a sharp lookout also for codling moth; examine the bandages on the trees at least every ten days, and destroy all larvæ found therein; also gather and destroy all moth-infected fruit.

Gather Bartlett pears as soon as they are large enough, and store away in a cool shed to ripen; when they show signs of ripening, market, not before. If sent down green they will sell for cooking, and only fetch a small price. The right stage at which to gather is when the fruit is fully developed, and the flesh has lost its woody flavour, but is still quite hard. This is usually before the fly has stung it, and if gathered at this stage the fruit will ripen up properly without shrivelling, and develop its full flavour.

These remarks apply also to the Downs country, which is somewhat earlier than Stanthorpe.

The crop of the month in the Western tablelands is the grape; and the remarks I have made respecting this fruit when grown in the Southern Coast districts apply equally here. The fruit should be gathered dry, and wilted before it is packed. Too large cases are often used; cases holding from 20 to 30 lb., or crates holding six 6-lb. baskets, are preferable, the latter being the best package for shipping the fruit long distances. Keep the orchards well cultivated, and, where water for irrigation is available, give citrus trees a watering during the month, unless there has been a sufficient rainfall. When the orchard is irrigated, see that thorough cultivation follows the irrigation, so as to conserve the moisture in the soil.

Red scale, which is prevalent on citrus trees in the dry Western country, should be treated during the month. Cyaniding is the best remedy.

THE ATHERTON BUTTER FACTORY COMPANY.

Some interesting particulars of the operations of the above company were supplied in a report presented by the manager on 22nd July, and although somewhat belated for this month's issue of the "Q.A. Journal," the information supplied will doubtless prove of interest to many of our readers. The report showed that from 305 suppliers there were received 5,120 cans containing 237,034 lb. cream, from which were manufactured 52 tons 2 cwt. 2 qr. 10 lb. butter, being a decrease of approximately 3½ tons on the previous month. The corresponding period for last year shows a manufacture of 42 tons, which means this year's increase for June is 10 tons. Price: The price of butter still remains the same, at 1s. 7d. per lb. wholesale, but there is every likelihood of an increase in the near future, as advised by Southern butter experts. The Malanda branch has started pasteurising. The Cairns milk vendor, Mr. Harris, informed the company that he had arranged for an immediate supply from Malanda dairymen of about 60 gallons. The dairy inspector paid a visit to the Atherton factory during the month, in conjunction with the chairman, and was quite satisfied with the cleanliness and general appearance of same. It was resolved that Mr. Hamilton, formerly buttermaker, be re-employed in the factory as foreman and buttermaker; also that the foreman at each factory should present at each monthly meeting a report of the running of his factory during the previous month; also that there be tabled with the manager's financial statement figures showing the comparative running costs of each factory, for statistical purposes. Discussion took place concerning charges for cold storage required in Cairns, and it was resolved that the company's representatives should pay not more than the expected rate for one room, or a reasonable amount per box. It was agreed that estimates be obtained as to the cost of pumping buttermilk direct to Mr. J. P. Leinster's piggery. Mr. McWhinney, of the Farmers' Co-operative Distributing Company, was appointed to represent the company at the intended conference to discuss Mr. Massy Greene's scheme for organising the butter industry of the Commonwealth. Regret was expressed that owing to distance the company would not be able to send its own delegates. The report was unanimously adopted.

OLD NUMBERS OF THE JOURNAL.

The Department has on hand a number of the earlier issues of the *Queensland Agricultural Journal;* and, if any of our readers would like to have a few copies of these old issues, same will be supplied free of any charge. If, however, *any particular numbers are specified,* and they are available, a charge of 6d. each will be made.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET.

AT BRISBANE.

1919.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·3	5·33	5·30	5·47	4·59	6 4	4·46	6·27
2	6·2	5·34	5·29	5·48	4·59	6·5	4·46	6·28
3	6·1	5·34	5·28	5·48	4·58	6 6	4·46	6·29
4	6·0	5·35	5·27	5·49	4·57	6·7	4·46	6·30
5	5 59	5·35	5·26	5·49	4·56	6·8	4·46	6·31
6	5 58	5·36	5·25	5·50	4·55	6·8	4·46	6·32
7	5 57	5·36	5 24	5·50	4 55	6·9	4·46	6·32
8	5 56	5·37	5·23	5·51	4 54	6·9	4·46	6·33
9	5 55	5·37	5·22	5·51	4·53	6·10	4·47	6 33
10	5·54	5·38	5·21	5 52	4·53	6·11	4·47	6·34
11	5 53	5·38	5·19	5·52	4·52	6·11	4·47	6·35
12	5 51	5·38	5·18	5·53	4·52	6·12	4·47	6·36
13	5·50	5·38	5·17	5 53	4·52	6·13	4·47	6·36
14	5·49	5·39	5·16	5·54	4·51	6·14	4·48	6 37
15	5·48	5·39	5·15	5·54	4·51	6·14	4·48	6 37
16	5·47	5·40	5·14	5·55	4·51	6·15	4 48	6·38
17	5·46	5·40	5·13	5·55	4 50	6·15	4·19	6·38
18	5·45	5 41	5·12	5·56	4·50	6·16	4·49	6 39
19	5·44	5·41	5·11	5·56	4·49	6·17	4 49	6·39
20	5·43	5·42	5·10	5 57	4 49	6 18	4 50	6·40
21	5·41	5·42	5·9	5·57	4·48	6 19	4·50	6·40
22	5·40	5·43	5·8	5·58	4·48	6·20	4·51	6 41
23	5·39	5·43	5·7	5·58	4·47	6·21	4·51	6·41
24	5·38	5·44	5 6	5 59	4·47	6 22	4 52	6·42
25	5 37	5·44	5·5	5·59	4·47	6·23	4·52	6·42
26	5·35	5·45	5·4	6·0	4·47	6 24	4·53	6·43
27	5·34	5·45	5·3	6 1	4·46	6·25	4·53	6·43
28	5 33	5·46	5·2	6 2	4·46	6·26	4·54	6·44
29	5·32	5·46	5·1	6·3	4·46	6·26	4 54	6·44
30	5·31	5·47	5 0	6 3	4·46	6·27	4·55	6·45
31	...	...	5·0	6·4	...	...	4·56	6·45

PHASES OF THE MOON.

The Phases of the Moon commence at the times stated in Queensland, New South Wales, Victoria, and Tasmania, unless "summer time" is adopted.

		H. M.
3 Sept.	(First Quarter	12 22 a.m.
10 „	○ Full Moon	1 54 p.m.
17 „	) Last Quarter	7 32 a.m.
24 „	● New Moon	2 34 p.m.

The Moon will be in Perigee on 13th at 6 6 p.m., and in Apogee on the 29th at 3·30 p.m.

2 Oct.	(First Quarter	6 37 p.m.
9 „	○ Full Moon	11 39 p.m.
16 „	) Last Quarter	3 5 p.m.
24 „	● New Moon	6 40 a.m.

The Moon will be in Perigee on 11th at 2·54 p.m., and in Apogee on the 27th at 6·42 a.m.

1 Nov.	(First Quarter	11 43 a.m.
8 „	○ Full Moon	8 35 a.m.
15 „	) Last Quarter	1 41 a.m.
23 „	● New Moon	1 20 a.m.

The Moon will be in Perigee on 8th at 11·54 p.m., and in Apogee on the 23rd at 12·24 p.m.

1 Dec.	(First Quarter	2 47 a.m.
7 „	○ Full Moon	8 4 p.m.
14 „	) Last Quarter	4 2 p.m.
22 „	● New Moon	8 55 p.m.
30 „	(First Quarter	3 25 p.m.

The Moon will be in Perigee on 7th at 12·48 p.m., and in Apogee on the 20th at 1·36 p.m.

The Moon will cause an annular eclipse of the Sun on Nov. 23rd, but it will not be visible in Australia. There will also be a partial eclipse of the Moon on Nov. 8th which will be visible in England but not in Australia.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during September, October, and November may be roughly arrived at by adding 16 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets and the moonlight then extends all through the night, when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.